EFFECTIVENESS OF EXERCISES ON PHYSICAL ACTIVITY AND FATIGUE AMONG PATIENTS WITH CANCER IN ERODE CANCER CENTRE AT ERODE.

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A DISSERTATION SUBMITTED TO
THE TAMILNADU DR.M.G.R MEDICAL UNIVERSITY, CHENNAI IN PARTIAL FULLFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF SCIENCE IN NURSING
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CERTIFICATE

This is to certify that the dissertation entitled **"EFFECTIVENESS OF EXERCISES ON PHYSICAL ACTIVITY AND FATIGUE AMONG PATIENTS WITH CANCER IN ERODE CANCER CENTRE AT ERODE"** is a bonafied work done by **Ms. EDITH. C** M.Sc(N) II year Bishop's College of Nursing, Dharapuram in partial fulfilment of the university rules and regulations for award of Masters of Science in Nursing under my guidance and supervision during the academic year 2013- 2015

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II Kings 20:5

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ABSTRACT

Cancer has become a global burden. It is anticipated that 84 million people may die of cancer within 2015. The disease itself causes fatigue and decreased physical activity which is often accompanied with its treatment. Recently, many research studies suggest exercise is effective in reducing the fatigue and improve physical activity.

This study was aimed to evaluate the effectiveness of exercises on physical activity and fatigue among patients with cancer in Erode Cancer Centre at Erode.

The research approach used for the study was evaluative approach. The Quasi experimental non equivalent pre test post test control group only design was used. The conceptual frame work of the study was based on the modified "Widenbach's Helping Art of Clinical Theory (1964)". Non probability purposive sampling technique was used to select 60 samples for the study, 30 in experimental group and 30 in control group. The tool used for the study was Groningen's Activity Restriction Scale for physical activity and Fatigue Symptom Inventory scale for fatigue. Structured interview schedule was used to collect the data. Pre test was done on the first day. Exercises were taught to the patients in experimental group and practiced under supervision for 30 minutes once a day for 15 days. On the 15th day post test was conducted using the same scale. In control group pre test and post test were done on the 1st day and 15th day respectively using the same scale. The collected data were analyzed using descriptive statistics and inferential statistics.

The mean post test score of physical activity 14.6(SD±4.23) was significantly improved than the mean pre test score of physical activity 30.73 (SD±8.99) in the experimental group. The mean post test score of fatigue 29.1 (SD±14.82) was significantly lower than the mean pre test score of fatigue

80.96 (SD±12.56) in the experimental group. The paired ‘t’ value for physical activity was 11.64 which was significant at P<0.05 level of significance. The paired‘t’ value for fatigue was 49.42 which was significant at P<0.05 level of significance. The mean post test scores of physical activity in the experimental group 14.60 (SD± 4.23) was improved than the mean post test scores 30.13 (SD±9.67) of physical activity in the control group. The independent ‘t’ value was 8.07 which was significant at P<0.05 level of significance. The mean post test scores of fatigue in the experimental group is 29.1 (SD±14.82) was lower than the mean post test score 71.96 (±23.97) of fatigue in the control group. The independent‘t’ value was 7.93 which were significant at P<0.05 level of significance. There were no significant associations between physical activity and their selected demographic variables among patients with cancer except for education and area of residence. There was no significant association between fatigue and their selected demographic variable among patients with cancer except for sex.

The study findings revealed that exercises was beneficial and there was a significant reduction in fatigue and improvement in physical activity among patients with cancer in experimental group.

CHAPTER - I

(i)INTRODUCTION

You beat cancer by how you live, why you live,
and in the manner in which you live.

Stuart Scott (2014)

BACKGROUND OF THE STUDY

Health is a dynamic state of well-being characterized by a physical and mental potential, which satisfies the demands of life commensurate with age, culture, and personal responsibility.

World Health Organization., (2013)

The condition of good physical and mental health, especially when actively maintained by proper diet, exercise, and avoidance of risky behavior.

Houghton Mifflin Harcourt., (2013)

Wellness is an active process of becoming aware of and making choices towards a more successful existence**.**

National Wellness Institute., (2004)

Disease is defined as a particular destructive process in an organ or organism, with a specific cause and characteristic symptoms.

Webster's New World College Dictionary., (2013)

In humans, "disease" is often used more broadly to refer to any condition that causes injuries, disabilities, disorders, syndromes, infections, isolated symptoms, deviant behaviors, and atypical variations of structure and function. A chronic disease is one that lasts for a long time, usually at least six months. Cancer is one such disease.

Wikipedia., (2014)

Hippocrates (460 – 370 BC) described cancer in detail and used the Greek terms "carcinos" and ‘carcinoma” Hippocrates used to refer chronic ulcers or growths that seemed to be malignant tumors and "squirr (h) e" to refer to a type of cancer (epithelium) with a hard consistency due to the predominance of a sclerosis with a tissue retraction. Late Celsus (28 BC - 50 AC),a Roman doctor, translated the Greek word "carcinos" into the word "cancer", a Latin word meaning crab, crayfish, dunce and cancer as canker. Hippocrates then introduced the Greek word "carcinoma" as such in Latin. Now the term "cancer" rather referred to ulcers that looked malignant with a deep penetration, whereas the term "carcinoma" rather referred to more superficial premalignant and malignant lesions.

Ronald.W.Raven., (1990)

Cancer is a term used for diseases in which abnormal cells divide without control and are able to invade other tissues. Cancer cells can spread to other parts of the body through the blood and lymph systems.

National cancer Institute., (2014)

Cancer is a complex group of diseases with many possible causes including genetic factors, lifestyle factors such as tobacco use, diet, and physical activity, certain types of infections and environmental exposures to different types of chemicals and radiation.

Americans Cancer Society., (2014)

Each year on 4 February, WHO and International Agency for Research on Cancer (IARC) supports Union for International Cancer Control (UICC) to promote ways to ease the global burden of cancer.

World Health Organization., (2014)

Chronic diseases including heart disease, cancer, stroke, diabetes, and respiratory diseases share major risk factors beyond genetics and social inequalities including tobacco use, unhealthy diet, physical inactivity, and lack of access to preventive care. There are evidence-based interventions that are effective in modifying these risks and subsequently preventing disease. Evidence for prevention is strongest for measures aimed at reducing tobacco use and increasing physical activity, while large gaps remain in our knowledge about how to effectively change eating habits and achieve healthy weights in a population.

Helen Ann Haplin., (2010)

There is no scientifically sound study that found stress or grief can cause cancer. While prolonged emotional stress or profound grief can weaken the immune system, nobody has found any proof that these things cause cancer. So while persistent stress and grief are not good for health, there is no indication that they increase the risk for cancer.

Jo Ann LeQuang., (2014)

Sometimes the immune system doesn't see the cancer cells as foreign because the cells are not different enough from normal cells. Sometimes the immune system recognizes the cancer cells, but the response might not be strong enough to destroy the cancer. Cancer cells themselves can also give off substances that keep the immune system in check.

American Cancer Society., (2014)

Some of the signs and symptoms of cancer are an unexplained weight loss of 10 pounds or more may be the first sign of cancer. Fever is very common with cancer, especially if the cancer or its treatment affects the immune system. Fatigue is extreme tiredness. This is another way cancer can cause fatigue. Pain may be an early symptom with some cancers like bone cancers or testicular cancer. Pain due to cancer means it has already spread

(metastasized) from where it started. These signs and symptoms include Darker looking skin (hyperpigmentation) yellowish skin and eyes (jaundice) Reddened skin (erythematic) itching (pruritis) excessive hair growth.

American cancer society., (2014)

Cancer is a group of diseases that can cause almost any sign or symptom. The signs and symptoms will depend on where the cancer is, how big it is, and how much it affects the organs or tissues. If a cancer has spread (metastasized), signs or symptoms may appear in different parts of the body. As a cancer grows, it can begin to push on nearby organs, blood vessels, and nerves. This pressure causes some of the signs and symptoms of cancer. If the cancer is in a critical area, such as certain parts of the brain, even the smallest tumor can cause symptoms.

American cancer society., (2014)

When tumor cells starts to metastasis the new tumor despite character is called a secondary or metastatic tumor, and its cells are similar to those in the original tumor. Initially, nearby lymph nodes are struck early. The lungs, liver, brain and bones are the most common metastasis locations from solid tumors. The common symptom of metastasis are lymphadenopathy, cough, hemoptysis and dyspnea (shortness of breath), hepatomegaly (enlarged liver),nausea, Jaundice, bone pain, fracture of affected bones neurological symptoms such as headaches, seizures, and vertigo.

Rampling. R., (2004)

It has been estimated that more than 1 in 3 people (33%) will develop cancer at some point in their lifetime. Cancers can occur at any age, but the risk of developing cancer increases with age. Cancer is not common in children or young people. Three-quarters (75%) of all newly diagnosed cancers occur in people aged 60 or over. Less than 1 in 100 (1%) of cancers are

diagnosed in children, aged 14 years or under. About 1 in 10 (10%) of cancers are diagnosed in people aged 25-49.

Macmillan Cancer Support., (2011)

Cancer burden also varies by socioeconomic status. The costs of socioeconomic cancer disparities were estimated two ways primarily by reducing disparities between countries with different poverty rates secondarily by reducing disparities between countries with different levels of educational attainment. Cancer disparities associated with poverty results in over 734.7 thousand life years lost, annually.

National Health Disparities., (2008)

The care of patients suffering from advanced cancer is not limited in the hospital setting. It continues at home where the burden of care is borne by specific individuals. During a personal interview the most frequent problems reported were anxiety regarding the patient's future (61.8%), troublesome symptoms such as pain (54%), increased economic burden-financial difficulty (51.3%), problems with patient's feeding (50%), unhappiness or depression (48.7%), emotional upset (47.4%), worsening of the patient's behavior and personality (38.2%), difficulty of establishing a positive attitude regarding their current status (34.2%), transport to hospital (32.9%), assistance from the wider family circle (25%). Taking care of cancer patients at home creates several problems among care givers. Many of them remain undetected. The acknowledgement and recognition of these problems by health-care professionals might contribute to finding solutions in order to assist the difficult task of these individuals.

Tsigaroppoulos.T., (2009)

The average economic burden to a patient being treated at All India Institute of Medical Science (AIIMS) amounted to Rs.14, 031 (before start of radiotherapy), add to that Rs.8, 184 totaling up to Rs.22,215. If the average

expenditure of Rs.14, 597 made before coming to AIIMs is added, an average cancer patient surveyed in the study would have to bear an economic burden of Rs.36, 812 for the entire cancer therapy course. Anyone who requires other forms of treatment including surgery and chemotherapy obviously will have to pay more. Most often, depending on their type and stage of cancer, patients will require more than one form of treatment.

The Hindu., (2014)

Cancer can be treated by surgery, chemotherapy, radiation therapy Immunotherapy, and monoclonal antibody therapy. The choice of therapy depends upon the location and grade of the tumor and the stage of the disease as well as the general state of the patient (performance status). A number of experimental cancer treatments are also under development. Complete removal of the cancer without damage to the rest of the body is the goal of treatment.

Papanastassiou., (2004)

Radiation therapy, radiotherapy, or radiation oncology, often abbreviated RT, RTx, or XRT, is the medical use of ionizing radiation, generally as part of cancer treatment to control or kill malignant cells. Radiation therapy may be curative in a number of types of cancer if they are localized to one area of the body. It is a part of adjuvant therapy, to prevent tumor recurrence after surgery to remove a primary malignant tumor (for example, early stages of breast cancer). Radiation therapy is synergistic with chemotherapy, and has been used before, during, and after chemotherapy in susceptible cancers.

Lutz.S., (2014)

Chemotherapy (often abbreviated to chemo and sometimes CTX or CTx) is a category of cancer treatment that uses chemical substances, especially one or more anti-cancer drugs (chemotherapeutic

agents) that are given as part of a standardized chemotherapy regimen. Chemotherapy may be given with a curative intent, or it may aim to prolong life or to reduce symptoms. It is often used in conjunction with other cancer treatments, such as radiation therapy, surgery, and/or hyperthermia therapy.

Hickan Ja., (2004)

Alternative cancer treatments are alternative or complementary treatments for cancer that have not been approved by the government agencies responsible for the regulation of therapeutic goods. They include diet and exercise, chemicals, herbs, devices, and manual procedures.

Cassileth.R., (2001)

The commonly used complementary therapies in US are prayer (45.5%), herbalism (11.6%), meditation (7.6%), chiropractic medicine (7.5%), yoga (5.1% - 6.1%), body work (5%), diet based therapy (3.5%), progressive relaxation (3%), mega- vitamin therapy (2.8%) and visualization (2.1%).

Zollmen., (1999)

Targeted therapy or targeted molecular therapy targets specific cells by interfering with the carcinogenesis and tumor growth rather than by simply interfering with all rapidly dividing cells. Radiotherapy is not considered a 'targeted therapy' despite its often being aimed at the tumors. Targeted cancer therapies are expected to be more effective than current treatments and less harmful to normal cells. There are targeted therapies for breast cancer, multiple myeloma, lymphoma, prostate cancer, melanoma and other cancers.

Zhukov. N.V., (2008)

It is an accepted fact that modern day anti- cancer strategies also results in increased levels of fatigue, anxiety, depression with consequent effect on physical and mental function, resulting in deterioration of quality of life in

many instances. Complementary and alternative medicine has therefore made significant inroads as accessory modality in cancer care, providing a feasible option for improvement in general well being, palliation or occasionally even cure.

Munshi.A.et. al., (2008)

World Cancer Day, annual observance held on February 4 that is intended to increase global awareness of cancer. World Cancer Day originated in 2000 at the first World Summit against Cancer, which was held in Paris. At this meeting leaders of government agencies and cancer organizations from around the world signed the Charter of Paris against Cancer, a document containing 10 articles that outlined a cooperative global commitment to improve the quality of life of cancer patients and to the continued investment in and advancement of cancer research, prevention, and treatment. Article X of the charter formally declared February 4 as World Cancer Day so that each year, the Charter of Paris will be in the hearts and minds of people around the world.

David Kayat., (2012)

Black Ribbon is a symbol for melanoma. Brown Ribbon is known for as an anti-tobacco symbol .Burgundy Ribbon is a symbol for multiple myeloma and Thalassemia. Dark Blue Ribbon is a symbol for Colon or Prostate Cancer awareness. Gray Ribbon is a symbol for brain cancer. Green Ribbon is commonly associated with liver cancer, gall bladder/bile duct cancer. Lime Green is for Non-Hodgkin's lymphoma. Gold Ribbon is a symbol for childhood cancer. Lavender Ribbon is a symbol for all cancer awareness. Light Blue Ribbon is a symbol for childhood cancer, prostate cancer. Orange Ribbon is a symbol for kidney cancer, leukemia. Peach Ribbon is for uterine cancers. Pearl Ribbon is a symbol for lung cancer. Periwinkle Ribbon is a symbol for esophageal cancer. Pink Ribbon is most commonly associated with breast cancer awareness; this ribbon is also a symbol for childhood cancer

awareness. Purple Ribbon is a symbol of pancreatic cancer. Teal Ribbon is a symbol for ovarian, cervical, and uterine cancers. Violet Ribbon represents Hodgkin's Lymphoma and Testicular Cancer.

Deblin., (2014)

A National cancer control programme is a public health programme designed to reduce the number of cancer cases and deaths and improve quality of life of cancer patients, through the systematic and equitable implementation of evidence-based strategies for prevention, early detection, diagnosis, treatment, and palliation, making the best use of available resources. A comprehensive national cancer programme evaluates the various ways to control disease and implements those that are the most cost-effective and beneficial for the largest part of the population. It places emphasis on preventing cancers or detecting cases early so that they can be cured, and provide as much comfort as possible to patients with advanced disease.

World Health Organization., (2014)

Levels of physical activity and energy intake also decreased significantly during treatment compared with baseline levels.

Demark-Wahnefried.W., (2005)

Cancer – related fatigue is reported by patients to be the most distressing symptom experienced during and after treatment. Unrelieved fatigue often accompanies other symptoms and leads to decreased physical functioning and lowers health related quality of life.

Berger. M.A., (2009)

Increasing physical activity may influence insulin and leptin levels and influence breast cancer prognosis.

National Cancer Institute., (2014)

Physical activity may protect against colon cancer and tumor development through its role in energy balance, hormone metabolism, insulin regulation, and by decreasing the time the colon is exposed to potential carcinogens. Physical activity has also been found to alter a number of inflammatory and immune factors, some of which may influence colon cancer risk.

National Cancer Institute., (2014)

At least 20 studies of people with breast, colorectal, prostate, and ovarian cancer have suggested that physically active cancer survivors have a lower risk of cancer recurrence and improved survival compared with those who are inactive. Exercise has been shown to improve cardiovascular fitness, muscle strength, body composition, fatigue, anxiety, depression, self-esteem, happiness, and several quality of life factors in cancer survivors.

American Cancer Society., (2014)

Being physically active reduces the risk of developing breast, bowel or womb cancer. Keeping active could help to prevent more than 30,000 cases of cancer every year.

Cancer Research UK., (2014)

Among cancer patients lack of activity can result in stiffness. After an allogeneic bone marrow transplant (using a donor's cells), a condition called graft-versus-host disease can lead to tightening of the body's connective tissues and loss of flexibility. Swelling and surgery may also limit the ability of a joint to move through its full range. Treatment may include manual techniques to loosen connective tissue restrictions and stretch muscles to improve flexibility in the most restricted joints.

Seattle Cancer Care Alliance., (2014)

As the survival from cancer continues to increase, people are seeking to restore quality to their lives. Because the goal of physical therapy is to maximize a person's functional ability, referrals to physical therapy are an appropriate way to address these concerns. Physical therapy can make a meaningful contribution to the health care team caring for the patient with cancer.

American society of clinical oncology., (2014)

An effective exercise program for cancer patients includes three components. An aerobic workout that pumps heart rate. Examples include brisk walking (outdoors or on a treadmill), jogging, swimming, or bicycling. Strength training to tone and build muscles. This includes lifting weights or working with a machine circuit or resistance bands. Stretching to keep muscles and joints limber.

National comprehensive cancer network., (2014)

Several studies in the past have shown power of physical activity in both prevention and treatment of many chronic diseases. The US Department of Health and Human Services and American Cancer Society recommend either 150 minutes of moderate intensity physical activity or 75 minutes vigorous intensity physical activity per week to remain fit and fine. Breast cancer treatment requires many types of surgical procedures including breast biopsy, mastectomy or breast reconstruction. Exercising regularly is the only way to recover fast after the surgery, according to the experts from American Cancer Society.

Roshni Mahesh., (2014)

People who exercised had almost a 50% lower risk of bladder cancer death as compared with survey respondents who reported no physical activity. Neither obesity nor being overweight had a significant association with bladder cancer mortality in people who were initially cancer free.

Kelloge Parson.J., (2014)

Exercise plays a dramatic role in preventing cancer of the colon and rectum. Encouragingly, more than three dozen studies show exercisers reduce their risk of colon cancer by 20 percent or more compared to sedentary people, and the benefits are seen in both men and women, although the effect is greater in men. Changes in digestive acids and other substances also occur with exercise, and these changes are believed to provide some protection from colon cancer. Decreases in body fat, insulin and other growth factors also may contribute to exercisers lower colon-cancer risk. Current research is also uncovering new ways in which physical activity cuts cancer risk from reducing chronic inflammation to improve DNA repair.

Fred Huchion Cancer Center., (2014)

The American Cancer Society, as well as the U.S. Centers for Disease Control and Prevention (CDC), recommends that cancer survivors get 150 minutes of moderate or 75 minutes of vigorous intensity physical activity, along with at least 2 strength training sessions, each week.

Elizabeth Mendes., (2014)

NEED FOR THE STUDY

World Health Organization (WHO) recently projected that in 2010, cancer would overtake ischemic heart disease as the leading cause of death in the world. Between 2005 when some 7.6 million people died from cancer, accounting for 13% of global deaths and 2015, it is anticipated that 84 million people will die of cancer. In 2008, approximately 72% of cancer deaths occurred in low and middle income countries where, although cancer has a lower incidence, survival rates are also much lower, largely because of delays in diagnosis leading to presentation with advanced disease. Many poor patients receive affordable (by their standards) or available treatment rather than optimal treatment, and those with little chance from benefiting from cancer treatment, or without financial support, are not infrequently sent home to die without even the comfort of palliative care. Many patients who remain

uncounted never reach a center capable of providing appropriate treatment. This catastrophe will soon become a crisis, since the global cancer burden is increasing rapidly in developing countries where populations continue to expand and communicable diseases are better controlled, resulting in longer life spans.

Ban Ki-Moon., (2014)

The latest cancer statistics from the World Health Organization's International Agency for Research on Cancer predict that if current trends continue, the global burden of new cancer cases will surge from 14.1 million in 2012 to 19.3 million by 2025.

International Network for cancer Treatment and Research., (2014)

Cancer will become an increasingly important factor in the global burden of disease in the decades to come. The estimated number of new cases each year is estimated to rise from 10 million in 2000 and 15 million in 2020. Some 50% of all these cases will occur in the less developed parts of the world.

Banki-Moon., (2014)

There were 14.1 million new cancer cases, 8.2 million cancer deaths and 32.6 million people living with cancer (within 5 years of diagnosis) in 2012 worldwide. 57% (8 million) of new cancer cases, 65% (5.3 million) of the cancer deaths and 48% (15.6 million) of the 5 year prevalent cancer cases occurred in the less developed regions. The overall age standardized cancer incidence rate is almost 25% higher in men than in women, with rates of 205 and 165 per 100,000 respectively. Male incidence rates vary almost five- fold across the different regions of the world, with rates ranging from 79 per 100,000 in western Africa to 365 per 100,000 in Australia /New Zealand.

Albert Thomas., (2014)

The WHO reports that sub-Saharan Africa, with 11% of the world's population and 25% of the global burden of disease, accounts for less than 1% of global health expenditure. In contrast, the Americans, with 14% of the worlds' population and 10% of the global burden of disease, account for more than 50% of the global health expenditure.

International Network for cancer Treatment and Research., (2014)

Incidence rates increased by 14% in Miyagi (Japan) from 1973-1977 to 1998-2002, by 40% in Chennai (India) from 1983-1987 to 1998-2002, and by 4.5% per year in Kampala (Uganda).

Kolonel.L., (2010)

10 million new cancer cases each year 4.7 million are in the more developed lobbed often regarded principally as a problem of the developed world, in fact more than half of all the cancers occur in the developing countries in those countries cancer is the second most leading cause of death and epidemiological evidence points to the emergence of a similar trend in the developing countries.

World Health Organization., (2014)

National Institute of Health and Family Welfare (NIHFW), it is clear that India accounts for the 86% of the total oral cancer figure across the globe. 90% of oral cancer is caused by chewing tobacco and eating gutka. Each year there are 1.5 lakh of cancer cases because of tobacco use. Cancer of oral cavity can be detected at a very early stage and the patient is then kept away from those things and given lots of yellow and green vegetables.

Ramandeep Kaur., (2013)

About 30% of cancer deaths are due to the five leading behavioral and dietary risks are high body mass index, low fruit and vegetable intake, lack of physical activity, tobacco use, alcohol use. Tobacco use is the most important

risk factor for cancer causing over 20% of global cancer deaths and about 70% of global lung cancer deaths. Cancer causing viral infections such as HBV/HCV and HPV are responsible for up to 20% of cancer deaths in low- and middle-income countries.

Globocan., (2012)

According to the latest World Cancer Report from the World Health Organization (WHO), more women in India are being newly diagnosed with cancer annually. As against 4.77 lakh men, 5.37 lakh women were diagnosed with cancer in India in 2012. In terms of cancer deaths, the mortality rate among men and women in India is almost the same. While 3.56 lakh men died of cancer in 2012 in India, the corresponding number for women was 3.26 lakh.

Times of India., (2013)

New cases diagnosed in 2012 shows that breast cancer in women was the second most common cancer with nearly 1.7 million new cases in 2012.Colorectal cancer was the third most common cancer with nearly 1.4 million new cases in 2012.

Ferlay.J., (2013)

One in every 10 Indian runs the risk of getting cancer before 75 years of age, while seven in every 100 runs the risk of dying from cancer before their 75th birthday.

Times of India., (2013)

In Delhi tobacco related lung cancer (32.1%) was the most common cancer followed by cancer of larynx (18.8%) and urinary bladder (5.6%).

Rania.V., (2007)

In Bangalore the total cancer cases would go up from 9, 79,786 cases in 2010 to 1,148,757 cases in the year 2020.

Takiar.R., (2010)

In Chennai, the total cancer burden is predicted to increase by 32% in 2012–16 compared with 2002–06, with 19% due to changes in cancer risk and a further 13% due to the impact of demographic changes. The incidence of cervical cancer is projected to drop by 46% in 2015 compared with current levels; while a 100% increase in future thyroid cancer incidence is predicted. Among men, a 21% decline in the incidence of esophageal cancer by 2016 contrasts with the 42% predicted increase in prostate cancer. Breast cancer would dislodge cervical cancer as the top-ranking cancer in the state, while lung, stomach and large bowel cancers would be more than cervical cancer ranking in Chennai by 2016.

Swaminathan.R., (2011)

Erode district is witnessing an alarming number of cancer cases due to drinking water contamination from the deadly chemical discharge by various factory units into Kalingarayan canal. Erode district is one of the worst hit cancer districts in Tamil Nadu.

Sudhahar.P., (2010)

One of the major reasons for the high incidence of oral cancer is the continued use of tobacco. It is estimated that around 40% of the men and 15% of women use tobacco on a regular basis. However, in certain areas of the country regular use increases to over 85% in men and 65% in women. Tobacco related cancers accounts for about 52% of all cancers in males and 25% of all cancers in females.

Khan.Y., (2003)

Tobacco use is the single greatest avoidable risk factor for cancer mortality worldwide, causing an estimated 22% of cancer deaths per year. In 2004, out of 7.4 million only 1.6 million died due to tobacco use.

World Health Organization., (2014)

1% of cancer in the UK more than 3000 cases every year are linked to people doing less than government guidelines for physical activity, at least 150 minutes (2 hours and 30 minutes) of moderate-intensity aerobic activity and 75 minutes (1 hour and 15 minutes) of vigorous-intensity aerobic activity.

International Network for cancer Treatment and Research., (2013)

Lack of physical activity is estimated to cause 3.2 million deaths worldwide annually. Globally 31% of adults aged 15 years or older were insufficiently active (men 28% and women 34%) in 2008.

World Cancer Research Fund International., (2009)

WHO concluded that the relative risk associated with inactivity was 1.25 (95% confidence interval-1.39) for women aged 45 to 69 years A recent "best evidence" review found strong support for a 20% to 80% risk reduction among postmenopausal women and suggested that for each additional hour per week of physical activity, the risk of breast cancer incidence decreased by 6%.

Kolonel., (2014)

At least 20 studies of people with breast, colorectal, prostate, and ovarian cancer have suggested that physically active cancer survivors have a lower risk of cancer recurrence and improved survival compared with those who are inactive.

American cancer society., (2014)

About 4 of 10 adults in United States use some type of complementary and alternative medicine (CAM) therapy, with the rate higher among patients with serious illness such as cancer. Nurses play a critical role in assessment and education of CAM use with survivor programs, with ultimate goal being increased overall wellbeing and survival.

Bell.M.R., (2010)

A study on complementary and alternative medicine (CAM) use among 36 patients with locally advanced cancer patients shows 47% were using CAM. CAM users were more likely to be younger, married and of Asian ethnicity. This therapy was used concurrently with conventional treatment in 88% cases and patients had less severe anxiety and depression. Currently 20%-84% of cancer patients are using complementary therapies. So there should be more research in those fields.

Heyler.K.L., (2006)

World Cancer Day 2014 will build on the success of last year's campaign, by again focusing on Target 5 of the World Cancer Declaration- Dispel damaging myths and misconception about cancer, under the tag line "debunk the myths" for 2015 "Not beyond us" to take a positive and proactive approach to the fight against cancer, highlighting that solutions do exist across the continuum of cancer, and that they are within our reach.

Union for International Cancer Control., (2014)

The investigator observed during clinical postings in Health Care Global Enterprises (HCG) cancer centre, Erode that the patients with cancer were having fatigue, limited physical activity and disturbed sleeping pattern related to diagnosis of cancer and its treatment. The patients were given high doses of cancer medication therapy which induced fatigue and affected physical activity. The researcher felt to help the patients to use exercise to reduce the fatigue and improve their physical activity.

STATEMENT OF THE PROBLEM

A study to assess the effectiveness of exercises on physical activity and fatigue among patients with cancer in Erode Cancer Centre at Erode.

OBJECTIVES

1. To assess the pre test and post test level of physical activity among patients with cancer in experimental and control group.
2. To assess the pre test and post test level of fatigue among patients with cancer in experimental and control group.
3. To compare the pre test and post test level of physical activity among patients with cancer in experimental group.
4. To compare the pre test and post test level of fatigue among patients with cancer in experimental group.
5. To find the effectiveness of exercises on post test level of physical activity among patients with cancer between experimental and control group.
6. To find the effectiveness of exercises on post test level of fatigue among patients with cancer between experimental and control group.
7. To find the association between post test level of physical activity among patients with cancer and their selected demographic variables in experimental group.
8. To find the association between post test level of fatigue among patients with cancer and their selected demographic variables in experimental group.

OPERATIONAL DEFINITIONS

EFFECTIVENESS

A measure of the accuracy or success of a diagnostic or therapeutic technique when carried out in an average clinical environment.

Medical dictionary., (2015)

In this study it refers to determining the extent to which selected exercises has brought about the significant difference between the pre test and post test level of physical activity and fatigue by using statistical measures and its scores.

EXERCISES

A particular set of movements intended to improve health.

Collin., (2014)

In this study exercises includes bench press, seated chest press, standing push up, standing shoulder press, unilateral triceps extension, chair raise, abdominal crunch, shoulder stretch, triceps stretch and low back stretch. Each exercise is done for 3 minutes covering totally 30 minutes for all the exercises. It is done once in a day for 15 days.

Bench press

Starting position: Align elbows just below shoulder line and maintain approximately 90 degrees of elbow flexion at starting position.

Final position : Fully extend elbow joint, breathing out during the lift. Maintain legs in raised position to provide better support for the back (flat lower back position).

Seated chest press

Starting position : Align elbows with shoulders and maintain approximately 90 degrees of elbow flexion at starting position.

Final position : Fully extend the elbow joint, breathing out during the push (extension of arms). Maintain back flat against chair for proper support.

Standing push-up

Starting position : Standing, feet shoulder-width apart, leaning slightly on the wall with outstretched arms.

Final position : Move the body slowly towards the wall, bending the arms at the elbow, and then push out the body (bodyweight resistance). Breathe out when pushing the resistance up.

Standing shoulder press

Starting position : Standing, feet shoulder-width apart. Holding the weight with elbows almost at full flexion (almost touching trunk).

Final position : Full extension of elbows and shoulder flexion. Breathe out during the lift and maintain good posture at all times.

Unilateral triceps extension

Starting position : Standing, with shoulders flexed. Resistance on the exercising arm and other arm acting as support.

Final position : Fully extend the elbow, breathing out when lifting the resistance.

Chair rise

Starting position : Seated, with hands on knees. Progress to arms across chest.

Final position : Stand, by extending hip and knees, with assistance of hands on knees. Progress to standing without assistance. Breathe out when standing.

Abdominal crunch

Starting position : Hip and knee flexion with arms crossed together over the trunk. Lower back flat on the floor. For increased difficulty place hands on head.

Final position : Partially flex the trunk, maintaining the lower back flat on the floor during the lift. Breathe out on the way up and then return to starting position.

Shoulder stretch

Technique : Pull arm across chest, elbow just below shoulder line. Hold the position for several seconds (15-30 seconds). Perform the exercise for both sides.

Triceps stretch

Technique : Raise arm, bend elbow and point forearm down the back. Pull arm, using elbow, down the back. Hold stretch for 15-30 seconds. Perform the exercise for both sides.

Lower back stretch

Technique : Sit with feet on the ground and knees partially bent. Curl (flex) the trunk forward and hold for 15-30 seconds.

PHYSICAL ACTIVITY

Physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure.

World Health Organization., (2014)

In this study the level of physical activity refers to the daily activities performed by patients fully independently without any difficulty which is measured by Groningen's Activity Restriction Scale and its scores.

FATIGUE

Weariness or exhaustion from labor, exertion, or stress.

Merriam Webster., (2014)

In this study fatigue refers to a sense of tiredness related to cancer that interferes with usual functioning which is measured by Fatigue Symptom Inventory scale and its scores.

CANCER

Cancer is a term used for diseases in which abnormal cells divide without control and are able to invade other tissues. Cancer cells can spread to other parts of the body through the blood and lymph systems.

National Cancer Institute., (2014)

In this study cancer refers to all types of cancer which requires treatment such as radiation therapy and chemotherapy.

PATIENTS WITH CANCER

Patient is any person who is receiving treatment for cancer.

National Cancer Institute., (2014)

In this study persons who are diagnosed with cancer undergoing treatment and admitted in the cancer ward.

HYPOTHESES

H_1: The mean post test score of physical activity is significantly improved than the mean pre test score of physical activity in experimental group.

H_2: The mean post test score of fatigue is significantly lower than the mean pre test score of fatigue in experimental group.

H_3: The mean post test score of physical activity in the experimental group is significantly improved than the mean post test score of physical activity in control group.

H_4: The mean post test score of fatigue in experimental group is significantly lower than the mean post test score of fatigue in control group.

H_5: There will be a significant association between post test score of physical activity among patients with cancer and their selected demographic variables.

H_6: There will be a significant association between post test score of fatigue among patients with cancer and their selected demographic variables.

ASSUMPTIONS:

- Patients with cancer experience a decline in physical activity.
- Patients with cancer experience fatigue.
- Nurses play a vital role in providing physical exercises to the patients with cancer thereby improves the physical activity and reduce the fatigue.

DELIMITATION

This study was delimited to,

- Sample size was limited to 60.
- Data collection period was only 6 weeks.

PROJECTED OUTCOME

Exercises will improve the physical activity and reduces the cancer related fatigue among patients with cancer. It helps to reduce the cost and duration of treatment. It promotes activities of daily living and reduces the level of fatigue.

(ii)CONCEPTUAL FRAMEWORK

Conceptual framework helps to express about ideas in a more reality, understandable, or precise form of the original conceptualization. The conceptual framework for this study was directed from **Wiedenbach's Helping Art of Clinical Nursing Theory (1964)**.

According to Ernestine Wiedenbach's nursing is nurturing and caring for someone in a motherly fashion. Nursing is a helping service that is rendered with compassion, skill and understanding to those in need for care, counsel and confidence in the area of health. The practice of nursing comprises a wide variety of services each directed toward the attainment of one of its three components.

Step 1 **:** Identification of a need for help.
Step 2 **:** Ministration the help needed.
Step 3 **:** Validation that the need for help was met.

CENTRAL PURPOSE

According to the theorist the nurse's central purpose defines the quality of health. She desires to effect or sustain in her patient and specifies what she recognizes to be her special responsibility in caring for the patient.

In this study, the central purpose is to reduce the level of cancer related fatigue and improve physical activity among patients with cancer.

STEP 1: IDENTIFICATION OF A NEED FOR HELP

According to the theorist within the identification component there are four distinct steps. First, the nurse observes the patient, looking for an inconsistency between the expected behavior of the patient and the apparent behavior. Second, attempt to clarify what the inconsistency means. Third, determine the cause of inconsistency. Finally, she validate with the patient that her help is needed.

In this study, the demographic variables age, sex, education, occupation, family monthly income , religion, area of residence, duration of treatment, Pre assessment of level of physical activity and fatigue helped to clarify and to determine the cause of inconsistency finally to validate the patients need.

STEP II: MINISTRATION THE HELP NEEDED

According to the theorist in ministry of the patient the nurse may give advice or information, making referral, apply a comfort measures or carry out the therapeutic procedure. The nurse will need to identify the cause and if necessary make an adjustment in the plan of action.

Ministration of help needed, it has two components,

a) Prescription
b) Realities

Prescription

According to the theorist prescription is a directive activity. It specifies both the nature of the action that will most likely lead to fulfillment of the nurse's central purposes and the thinking process that determines it.

In this study, prescription is plan of care to achieve the purpose which includes administration of selected physical exercises for patients with cancer. Selected physical exercises include bench press, seated chest press, standing push up, standing shoulder press, unilateral triceps extension, chair raise, abdominal crunch, shoulder stretch, triceps stretch and low back stretch. The duration of the exercise is 30 minutes. It is continued every day in the morning for 15 days.

a)Realities

According to the theorist, the realities of the situation in which the nurse is to provide nursing care. Realities consist of all factors- physical,

physiological, emotional and spiritual that is at play situation in which nursing action occurs at any given moment. Widenbach defines the five realities as the agent, the recipient, the goal, the means, and the framework.

I. Agent

According to the theorist, the agent is the practicing nurse or delegate is characterized by personal attribute, capacities, capabilities and most importantly commitment and competence in nursing.

In this study, the investigator is the agent.

II.Recipient

According to theorist, the recipient is the patient, characterized by personal attribute, problems, capacities, aspirations, and most important, the ability to cope with the concerns or problems being experienced.

In this study, the recipients are patients with cancer.

III.Goal

According to the theorist, the goal is the desired outcome the nurse wishes to achieve. The goal is the end result to be attained by nursing action.

In this study, it refers to reduce the cancer related fatigue and improve the level of physical activity among patients with cancer.

IV.Means

According to the theorist, the means comprises the activities and devices through which the practitioner is enabled to attain the goal. The mean include skills, techniques, procedures, and devices that may be used to facilitate nursing practices.

In this study, it refers to administration of selected physical exercises by the researcher for 30 minutes every day morning for 15 days.

V.Framework

According to the theorist the framework consists of the human, environmental, professional and organizational facilities that not only make up the context within which nursing is practiced but also constitute its currently existing limits.

In this study, it refers to The Erode Cancer Centre at Erode.

Step III- Validation that need for help was met

According to the theorist the third component is validation. After the help has been ministered the nurse validates that the action were indeed helpful. Evidence must come from the patient that the purpose of the nursing action is fulfilled.

In this study the validation need was met by means of post assessment of level of physical activity by using Groningen's Activity Restriction Scale and fatigue by using Fatigue Symptom Inventory scale.

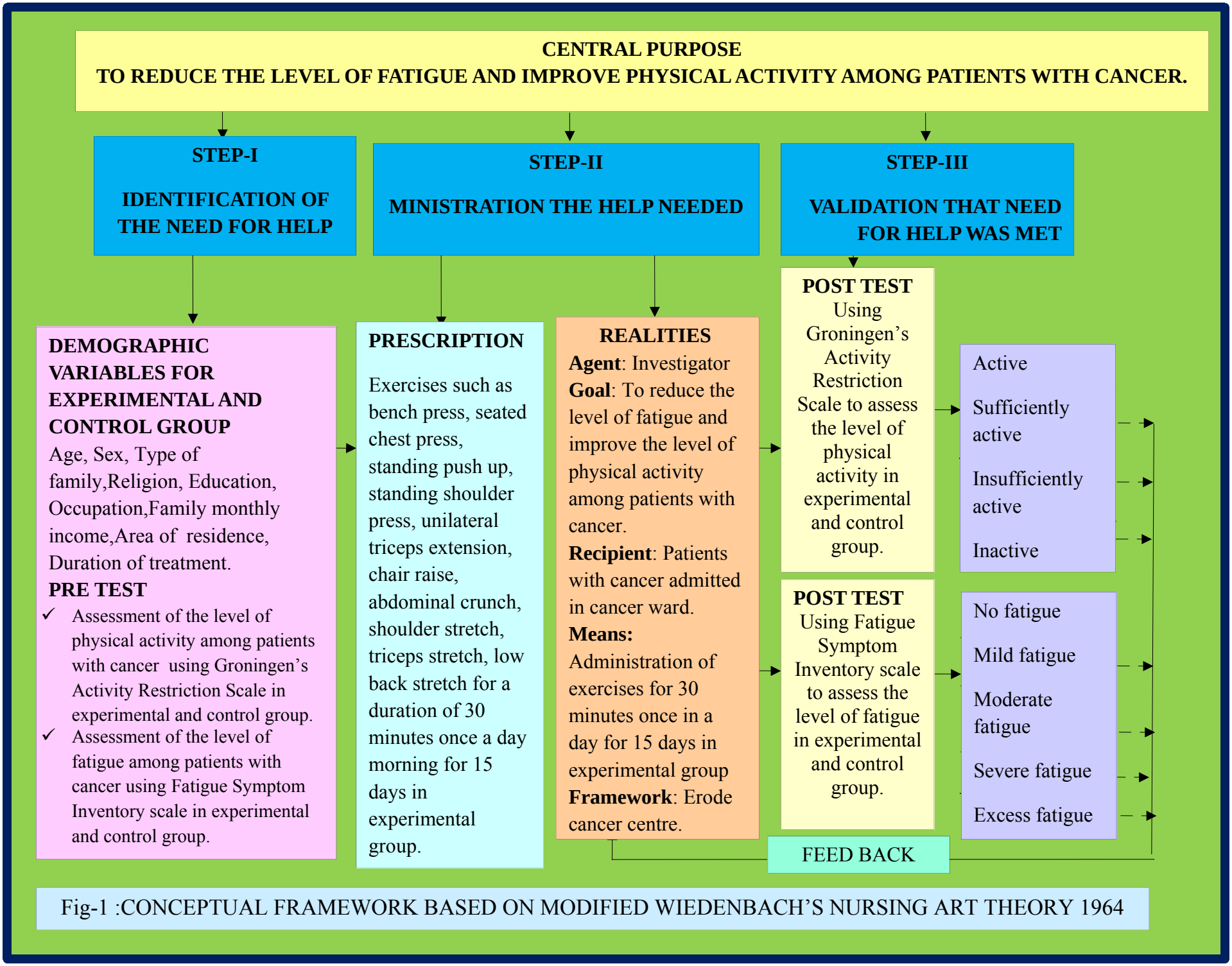


Fig-1 :CONCEPTUAL FRAMEWORK BASED ON MODIFIED WIEDENBACH'S NURSING ART THEORY 1964

CHAPTER - II
REVIEW OF LITERATURE

This chapter deals with the related review of literature. The literatures are classified under the following headings:

PART - I

Overview of

a) Cancer

b) Exercise

c) Fatigue and physical activity

PART- II

SECTION A : Studies related to incidence and prevalence of decreased physical activity and fatigue among patients with cancer.

SECTION B : Studies related to effectiveness of exercise on physical activity and fatigue among patients with cancer.

SECTION C : Studies related to nurses role on exercises among patients with cancer.

PART- I

a) OVERVIEW OF CANCER

INTRODUCTION

Cancer harms the body when damaged cells divide uncontrollably to form lumps or masses of tissue called tumors (except in the case of leukemia where cancer prohibits normal blood function by abnormal cell division in the blood stream). Tumors can grow and interfere with the digestive, nervous, and circulatory systems and they can release hormones that alter body function. Tumors that stay in one spot and demonstrate limited growth are generally

considered to be benign. Malignant tumors form when a cancerous cell manages to move throughout the body using the blood or lymph systems, destroying healthy tissue in a process called invasion and that cell manages to divide and grow, making new blood vessels to feed itself in a process called angiogenesis. When a tumor successfully spreads to other parts of the body and grows, invading and destroying other healthy tissues, it is said to have metastasized. This process itself is called metastasis, and the result is a serious condition that is very difficult to treat.

Peter Crosta., (2013)

DEFINITION

Cancer is a disease process that begins when an abnormal cell is transformed by the genetic mutation of the cellular DNA.

Brunner.et.al., (2014)

INCIDENCE

Cancers figure among the leading causes of morbidity and mortality worldwide. Among men, the 5 most common sites of cancer diagnosed in 2012 were lung, prostate, colorectal, stomach, and liver cancer. Among women the 5 most common sites diagnosed were breast, colorectal, lung, cervix, and stomach cancer. About 30% of cancer deaths are due to the 5 leading behavioral and dietary risks such as high body mass index, low fruit and vegetable intake, lack of physical activity, tobacco use and alcohol use. More than 60% of world's total new annual cases occur in Africa, Asia and Central and South America. These regions account for 70% of the world's cancer deaths.It is expected that annual cancer cases will rise from 14 million in 2012 to 22 within the next 2 decades.

World Health Organization., (2014)

CAUSES

- Biological and genetic factors
  - The cellular changes initiated by various degrees of interaction between host factors and exogenous agents.
  - Genes such as BRCA 1 or 2 for breast cancer.
  - Hormonal patterns and immunological capacities.
  - Sex-specific organs especially the uterus, breast, ovary and prostate because of the influenced of sex hormones.
  - Suppression of immunological function such as organ transplantation, Acquired Immunodeficiency Syndrome (AIDS).
- External agents
  - Physical such as solar radiation and ionizing radiation.
  - Chemical such as vinyl chloride and benzopyrene.
  - Biological such as hepatitis B virus and human papilloma virus.
- Dietary factors
  - excessive amounts of animal products in the diet, overweight/obesity.
- Occupation
  - agriculture, construction, demolition, shipbuilding, shipbreaking, petroleum, metal and rubber.
- Air and water pollution
  - carcinogenic agents in the air and into surface and ground waters as a result of industrial processes and the accidental or deliberate dumping of toxic wastes.
- The role of medical services and care
  - Iatrogenically induced carcinogen such as X- ray.
  - Drugs used to treat cancer are carcinogenic such as estrogens.

Wikipedia., (2014)

CLASSIFICATION OF CANCER

Anatomic site classification

SITE	BENIGN	MALIGNANT
Epithelial tissue tumors Surface epithelium Glandular epithelium	 Papilloma Adenoma	 Carcinoma Adenocarcinoma

Connective tissue tumors Fibrous tissue Cartilage Striated muscle Bone	Fibroma Chondroma Rhabdomyoma Ostemoma	Fibrosarcoma Chondrosarcoma Rhabdomyosarcoma Osteosarcoma
Nervous tissue tumor Meninges Nerve cells	Meningioma ganglioneuroma	Meningosarcoma
Hematopoietic tissue tumor Lymphoid tissues Plasma cells Bone marrow		Neuroblastoma Hodgkin's lymphoma Non hodgkin's lymphoma Multiple myelonma Lymphocytic and Myelogenous leukemia

HISTOLOGICAL CLASSIFICATION

Grade I : Cells differ slightly from normal cells (mild dysplasia) and are well differentiated.

Grade II : Cells are more abnormal (moderate dysplasia) and moderately differentiated.

Grade III : Cells are very abnormal (severe dysplasia) and poorly differentiated.

Grade IV : Cells are immature and primitive (anaplasia) and undifferentiated; cells of origin is difficult to determine.

EXTENT OF DISEASE CLASSIFICATION

Stage 0 : Cancer in situ.

Stage I : Tumor limited to the tissue of origin; localized tumor growth.

Stage II : Limited local spread.

Stage III : Extensive local and regional spread.

Stage IV : Metastasis.

TNM CLASSIFICATION SYSTEM

Primary tumor (T)

T_0	:	No evidence of primary tumor.
T_{is}	:	Carcinoma in situ.
T_{1-4}	:	Ascending degrees of increase in tumor size.
T_x	:	Tumor cannot be measured or found.

Regional lymph nodes (N)

N_0	:	No evidence of disease in lymph nodes.
N_{1-4}	:	Ascending degrees of nodal involvenment.
N_X	:	Regional lymph nodes unable to be assessed clinically.

Distant metastases

M_0	:	No evidence of distant metastasis.
M_{1-4}	:	Ascending degrees of metastatic involvement of the host, including distant nodes.
M_X	:	Cannot be determined.

Lewis., (2011)

PATHOPHYSIOLOGY

PREDISPOSING FACTORS:
eg: genetics

PRECIPITATING FATORS:
eg: environment, Virus, diet,tobacco use,life style,UV exposure, other carcinogens.

Cellular DNA mutation

Malignant cellular proliferation

Immune system failure to destroy cancer cells

C- Changes in bowel and bladder pattern
A-A sore that does not heal
U- Unusual bleeding
T- Thickening or lump
I-Indigestion /difficulty swallowing
O- Obvious changes in warts or mole or skin
N- Nagging cough/hoarseness of voice
U- Unexplained anemia
S- Sudden loss of weight

Mayo clinic., (2014)

CLINICAL MANIFESTATIONS

- Weight loss.
- Fever.
- Fatigue.
- Pain.
- Skin changes.

Warning Signs of Cancer

- Changes in bowel and bladder pattern.
- Sore that does not heal.
- White patches inside the mouth or white patches on the tongue.
- Unusual bleeding or discharge.
- Thickening or lump in the skin.
- Indigestion or troubled swallowing.
- Recent changes in wart or mole.

- Nagging cough or soreness.

National Cancer Institute., (2012)

COMPLICATIONS OF CANCER:

Cancer and its treatment can cause several complications, including:

- Pain.
- Fatigue.
- Difficult breathing.
- Nausea.
- Diarrhea or constipation.
- Weight loss.
- Chemical changes in the body.
- Brain and nervous system problems.
- Unusual immune system reactions to cancer
- Cancer that spreads.
- Cancer that returns.

Mayo clinic., (2014)

DIAGNOSTIC EVALUATION

- Enema.
- Biopsy.
- Bone Marrow Aspiration and Biopsy Bone Scan.
- Breast MRI for the Early Detection of Breast Cancer.
- Colonoscopy.
- Computed Tomography (CT) Scan**.**
- Digital Rectal Exam (DRE).
- EKG and Echocardiogram.
- Endoscopy.

- Fecal Occult Blood Tests (FOBT).
- Integrated (Positron emission tomography) PET-CT Scan.
- Magnetic Resonance Imaging (MRI).
- Mammography.
- Multi Gated Acquisition (MUGA) Scan.
- Pap test.
- Positron Emission Tomography (PET) Scan.
- Sigmoidoscopy.
- Tumor Marker Tests.
- Ultrasound.

Wikipedia., (2014)

MANAGEMENT

Surgery

In theory, non-hematological cancers can be cured if entirely removed by surgery, but this is not always possible. When the cancer has metastasized to other sites in the body prior to surgery, complete surgical excision is usually impossible. In the Halstedian model of cancer progression, tumors grow locally, then spread to the lymph nodes, then to the rest of the body. This has given rise to the popularity of local-only treatments such as surgery for small cancers. Even small localized tumors are increasingly recognized as possessing metastatic potential.

Examples of surgical procedures for cancer include mastectomy for breast cancer, prostatectomy for prostate cancer, and lung cancer surgery for non-small cell lung cancer. The goal of the surgery can be either the removal of only the tumor, or the entire organ. A single cancer cell is invisible to the naked

eye but can regrow into a new tumor, a process called recurrence. For this reason, the pathologist will examine the surgical specimen to determine if a margin of healthy tissue is present, thus decreasing the chance that microscopic cancer cells are left in the patient.

In addition to removal of the primary tumor, surgery is often necessary for staging, e.g. determining the extent of the disease and whether it has metastasized to regional lymph nodes. Staging is a major determinant of prognosis and of the need for adjuvant therapy.

Occasionally, surgery is necessary to control symptoms, such as spinal cord compression or bowel obstruction. This is referred to as palliative treatment. Surgery may be performed before or after other forms of treatment. Treatment before surgery is often described as neoadjuvant. In breast cancer, the survival rate of patients who receive neoadjuvant chemotherapy are no different to those who are treated following surgery. Giving chemotherapy earlier allows oncologists to evaluate the effectiveness of the therapy, and may make removal of the tumor easier. However, the survival advantages of neoadjuvant treatment in lung cancer are less clear.

CHEMOTHERAPY

Chemotherapy is the treatment of cancer with drugs ("anticancer drugs") that can destroy cancer cells.

- **Combined modality chemotherapy** is the use of drugs with other cancer treatments, such as radiation therapy, surgery and/or hyperthermia therapy.
- **Induction chemotherapy** is the first line treatment of cancer with a chemotherapeutic drug. This type of chemotherapy is used for curative intent.

- **Consolidation chemotherapy** is given after remission in order to prolong the overall disease-free time and improve overall survival. The drug that is administered is the same as the drug that achieved remission.
- **Intensification chemotherapy** is identical to consolidation chemotherapy but a different drug than the induction chemotherapy is used.
- **Combination chemotherapy** involves treating a patient with a number of different drugs simultaneously. The drugs differ in their mechanism and side-effects. The biggest advantage is minimizing the chances of resistance developing to any one agent. Also, the drugs can often be used at lower doses, reducing toxicity.
- **Neoadjuvant chemotherapy** is given prior to a local treatment such as surgery, and is designed to shrink the primary tumor. It is also given to cancers with a high risk of micro metastatic disease.
- **Adjuvant chemotherapy** is given after a local treatment (radiotherapy or surgery). It can be used when there is little evidence of cancer present, but there is risk of recurrence. It is also useful in killing any cancerous cells that have spread to other parts of the body. These micro metastases can be treated with adjuvant chemotherapy and can reduce relapse rates caused by these disseminated cells.
- **Maintenance chemotherapy** is a repeated low-dose treatment to prolong remission. Salvage chemotherapy or palliative chemotherapy is given without curative intent, but simply to decrease tumor load and increase life expectancy. For these regimens, in general, a better toxicity profile is expected.

Drugs used for chemotherapy

Alkylating agents

- Nitrogen Mustards, nitrosoureas, tetrazines, aziridines, cisplatins and derivatives, and non-classical alkylating agents.

Anti-metabolites

- Methotrexate and pemetrexed.

Anti-microtubule agents

- Vincristine and vinblastine.

Topoisomerase inhibitors

- Etoposide, doxorubicin, mitoxantrone and teniposide.

Cytotoxic antibiotics

- actinomycin, bleomycin, plicamycin, mitomycin and Doxorubicin.

RADIATION THERAPY

Radiation therapy (also called radiotherapy, X-ray therapy, or irradiation) is the use of ionizing radiation to kill cancer cells and shrink tumors.

External beam radiation therapy

- Conventional external beam radiation therapy (2DXRT) is delivered via two-dimensional beams using linear accelerator machines. 2DXRT mainly consists of a single beam of radiation delivered to the patient from several directions often front or back, and both sides. Stereotactic radiation is a specialized type of external beam radiation therapy.

Intensity-modulated radiation therapy (IMRT)

It is an advanced type of high-precision radiation that is the next generation of 3DCRT. IMRT also improves the ability to conform the treatment volume to concave tumor shapes.

Particle therapy

In particle therapy (proton therapy being one example), energetic ionizing particles (protons or carbon ions) are directed at the target tumor. The dose increases while the particle penetrates the tissue, up to a maximum (the Bragg peak) that occurs near the end of the particle's range, and it then drops to (almost) zero. The advantage of this energy deposition profile is that less energy is deposited into the healthy tissue surrounding the target tissue.

Auger therapy

Auger therapy (AT) makes use of a very high dose of ionizing radiation in situ that provides molecular modifications at an atomic scale.

Photodynamic therapy

Photodynamic therapy (PDT) is generally a non-invasive treatment using a combination of light and a photosensitive drug, such as 5-ALA, Foscan, Metvix, Tookad, WST09, WST11, Photofrin, or Visudyne. The drug is triggered by light of a specific wavelength.

Hyperthermia therapy

Localized and whole-body application of heat has been proposed as a technique for the treatment of malignant tumors. Intense heating will cause denaturation and coagulation of cellular proteins, rapidly killing cells within a tumor.

Brachytherapy

In brachytherapy, radiation sources are precisely placed directly at the site of the cancerous tumor. This means that the irradiation only affects a very

localized area – exposure to radiation of healthy tissues further away from the sources.

Radioisotope therapy (RIT)

Systemic radioisotope therapy is a form of targeted therapy. Targeting can be due to the chemical properties of the isotope such as radioiodine which is specifically absorbed by the thyroid gland a thousand fold better than other bodily organs. Targeting can also be achieved by attaching the radioisotope to another molecule or antibody to guide it to the target tissue.

Targeted therapies

Monoclonal antibody therapy is another strategy in which the therapeutic agent is an antibody which specifically binds to a protein on the surface of the cancer cells.

Immunotherapy

Cancer immunotherapy refers to a diverse set of therapeutic strategies designed to induce the patient's own immune system to fight the tumor. Contemporary methods for generating an immune response against tumors include intravesical BCG immunotherapy for superficial bladder cancer, and use of interferons and other cytokines to induce an immune response in renal cell carcinoma and melanoma patients.

Hormonal therapy

The growth of some cancers can be inhibited by providing or blocking certain hormones. Common examples of hormone-sensitive tumors include certain types of breast and prostate cancers. Removing or blocking estrogen or testosterone is often an important additional treatment. In certain cancers, administration of hormone agonists, such asprogestogens may be therapeutically beneficial.

Angiogenesis inhibitors

Angiogenesis inhibitors prevent the extensive growth of blood vessels (angiogenesis) that tumors require to survive. One of the main problems with

anti-angiogenesis drugs is that many factors stimulate blood vessel growth in cells normal or cancerous.

Biological therapy

Biological therapies are treatments that can control or stop the growth of cancer cells. Some types of biological therapy can treat advanced non small cell lung cancer. They include erlotinib (Tarceva), gefitinib (Iressa), crizotinib (Xalkori) and afatinib (Giotrif).

BACTERIAL TREATMENT

Chemotherapeutic drugs have a hard time penetrating tumors to kill them at their core because these cells may lack a good blood supply. Researchers have been using anaerobic bacteria, such as Clostridium novyi, to consume the interior of oxygen-poor tumors. These should then die when they come in contact with the tumors oxygenated sides, meaning they would be harmless to the rest of the body. A major problem has been that bacteria do not consume all parts of the malignant tissue. However, combining the therapy with chemotherapeutic treatments can help to solve this problem.

GENE THERAPY

Introduction of tumor suppressor genes into rapidly dividing cells has been thought to slow down or arrest tumor growth. Adenoviruses are a commonly utilized vector for this purpose.

EPIGENETICS

It is the study of heritable changes in gene activity that are not caused by changes in the DNA sequence, often a result of environmental or dietary damage to the histone receptors (histones are highly alkaline proteins found in eukaryotic cell nuclei that package and order the DNA into structural units called nucleosomes) within the cell.

TELOMERASE THERAPY

Because most malignant cells rely on the activity of the protein telomerase for their immortality, it has been proposed that a drug that inactivates telomerase might be effective against a broad spectrum of malignancies. At the same time, most healthy tissues in the body express little if any telomerase, and would function normally in its absence. Currently, Inositol hexaphosphate, which is available over-the-counter, is undergoing testing in cancer research due to its telomerase-inhibiting abilities.

ELECTROMAGNETIC TREATMENT

Tumor Treating Fields is a novel FDA-approved cancer treatment therapy that uses alternating electric field to disturb the rapid cell division exhibited by cancer cells.

ALTERNATIVE THERAPIES

- Aromatherapy.
- Ayurvedic medicine.
- German New Medicine.
- Bioresonance therapy.
- Electrohomeopathy (or Mattei cancer cure).
- Electro Physiological Feedback Xrroid.
- Light therapy.
- Magnetic therapy.
- Therapeutic Touch (or TT).

Natural substances

- Aloe.
- Capsicum.
- Castor oil.
- Chlorella.

- Grapes.

Physical procedures

- Applied kinesiology.
- Cupping.
- Reiki.

Spiritual and mental healing

- Cancer guided imagery.
- Faith healing**.**
- Hypnosis.
- Meditation **(**also Transcendental Meditation and Mindfulness**).**

Synthetic chemicals and other substances

- Antineoplaston therapy.
- Apitherapy.
- Insulin potentiation therapy is reduced.

Wikipedia., (2014)

b) OVERVIEW OF EXERCISE

DEFINITION

Activity requiring physical effort, carried out to sustain or improve health and fitness.

Oxford dictionary., (2014)

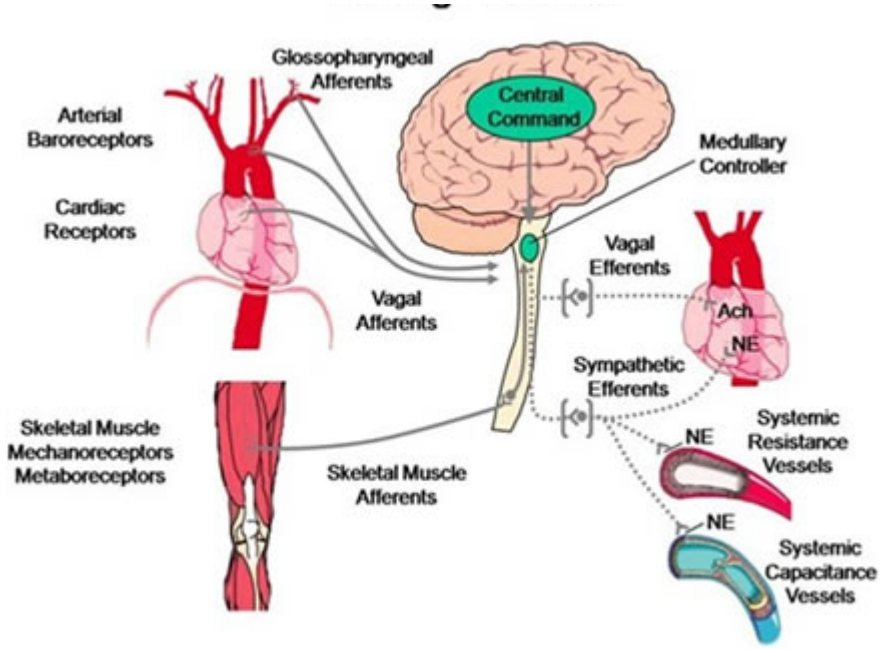
PURPOSE

Exercise is essential for

- ❖ Improving overall health.
- ❖ Maintaining fitness.
- ❖ Helping to prevent the development of obesity.
- ❖ Prevention of hypertension.
- ❖ Prevention of cardiovascular disease.
- ❖ Better cardiac function.
- ❖ Weight loss.
- ❖ Improving mental health.
- ❖ Helps the immune system.
- ❖ Reducing diseases.
- ❖ Increases longevity.
- ❖ Increases body resistance.
- ❖ Improves muscle health.
- ❖ Increases maximum consumption of oxygen by the body.
- ❖ Increases the supply of blood to muscles and the ability to make better use of oxygen.
- ❖ Lowers the accumulation of lactic acid which causes pain and muscles burning.
- ❖ Increasing levels of good HDL cholesterol in the blood.
- ❖ Reduces high blood triglycerides.
- ❖ Improvement of glucose metabolism reduces insulin resistance and therefore lowers the risk of diabetes or regulates better the disease if it has already occurred.
- ❖ Reduces psychological stress, improves mood with more vitality, reduces risk of expression or anxiety.
- ❖ Greater resistance to fatigue.
- ❖ Helps to sleep better.

American council on exercise., (2014)

PHYSIOLOGY OF EXERCISE:



In cancer when treatment is good prognosis also is good. But decreased physical activity because of fatigue remains a problem. Generally, exercise is prescribed in such cases.

Principles of exercise prescription

- **Adaptation-** the body alters its structure and function to be able to better perform that activity in the future.
- **Overload** - a situation in which the body is required to perform work beyond which it is accustomed to or is normal.

In general, the extent of the training adaptation is related to the degree of overload so greater overload results in more rapid and larger biological changes. Overload that is too great increases the risk of injury. It is important to find the overload that strikes a balance between optimal gain and risk of injury.

Modes of exercise

- Aerobic exercises.
- Resistance exercises.
- Flexibility exercises.

Edith Cowan university., (2014)

EXERCISES FOR CANCER PATIENTS

1. Bench press

Region : Chest and arms.

Major muscles : Pectoralis major, anterior deltoids, triceps brachii.

Description : Extension of elbows and horizontal adduction of shoulder by pushing the resistance up and controlling the return.

Starting position

Align elbows just below shoulder line and maintain approximately 90 degrees of elbow flexion at starting position.

Final position

Fully extend elbow joint, breathing out during the lift. Maintain legs in a raised position to provide better support for the back (flat lower back position).

2. Seated chest press

Region : Chest and arms.

Major muscles : Pectoralis major, anterior deltoids, triceps brachii.

Description : Extension of elbows and horizontal adduction of shoulder by pushing the resistance out and controlling the return.

Starting position

Align elbows with shoulders and maintain approximately 90 degrees of elbow flexion at starting position.

Final position

Fully extend the elbow joint, breathing out during the push (extension of arms). Maintain back flat against chair for proper support.

3. Standing push-up

Region	**:**	Chest, back and arms.
Major muscles	**:**	Pectoralis major, anterior deltoids, triceps brachii.
Description	**:**	Extension of elbows and horizontal adduction of shoulder by pushing the body up and controlling the return.

Starting position

Standing, feet shoulder-width apart, leaning slightly on the wall with outstretched arms.

Final position

Move the body slowly towards the wall, bending the arms at the elbow, and then push out the body (bodyweight resistance). Breathe out when pushing the resistance up.

4. Standing shoulder press

Region	**:**	Shoulders and arms.
Major muscles	**:**	Deltoids, triceps brachii, latissimus dorsi and biceps brachii.
Description	**:**	Shoulder flexion/abduction and elbow extension.

Starting position

Standing, feet shoulder-width apart. Holding the weight with elbows almost at full flexion (almost touching trunk**).**

Final position

Full extension of elbows and shoulder flexion. Breathe out during the lift and maintain good posture at all times.

5. Unilateral triceps extension

Region **:** Arms.

Major muscles **:** Triceps brachii.

Description **:** Extension of elbow with shoulder flexion.

Starting position

Standing, with shoulders flexed. Resistance on the exercising arm and other arm acting as support.

Final position

Fully extend the elbow, breathing out when lifting the resistance.

6. Chair rise

Region **:** Legs.

Major muscles **:** Quadriceps, hamstrings and gluteus.

Description **:** Knee and hip extension.

Starting position

Seated, with hands on knees. Progress to arms across chest.

Final position

Stand, by extending hip and knees, with assistance of hands on knees. Progress to standing without assistance. Breathe out when standing.

7. Abdominal crunch

Region **:** Trunk.

Major muscles **:** Rectus abdominis, internal and external oblique.

Description **:** Partial flexion of trunk.

Starting position

Hip and knee flexion with arms crossed together over the trunk. Lower back flat on the floor. For increased difficulty place hands on head.

Final position

Partially flex the trunk, maintaining the lower back flat on the floor during the lift. Breathe out on the way up and then return to starting position.

8. Shoulder stretch

Region **:** Arms

Major muscles **:** Deltoids

Description **:** Unilateral adduction of shoulders

Technique

Pull arm across chest, elbow just below shoulder line. Hold the position for several seconds (15-30 seconds). Perform the exercise for both sides.

9. Triceps stretch

Region **:** Arms.

Major muscles **:** Triceps brachii.

Description **:** Shoulder extension and elbow flexion.

Technique

Raise arm, bend elbow and point forearm down the back. Pull arm, using elbow, down the back. Hold stretch for 15-30 seconds. Perform the exercise for both sides.

10. Lower back stretch

Region **:** Trunk.

Major muscles **:** Lower back and hamstrings.

Description **:** Seated trunk flexion.

Technique

Sit with feet on the ground and knees partially bent for 15-30 seconds.

Edith Cowan university., (2014)

NURSES RESPONSIBILITIES DURING EXERCISE

Monitor oxygen uptake

As intensity increases, more oxygen is required by exercising muscle. The relative intensity of exercise can be expressed as a proportion of maximal oxygen uptake (%VO2max).

Monitor heart rate

The simplest and most often used heart rate assessment is the proportion of maximum heart rate (%HRmax).

Also used is percent of heart rate reserve (%HRR). HRmax = 220 − age (in years) %HRR = [(HRmax – HRrest) × %Intensity] + HRrest. The proposed intensity for cancer patients and survivors during aerobic activities is 60-90 percent of HRmax or 40-85 per cent of HRR.

It is important to monitor heart rate during the exercise sessions to ensure adequate intensity without working too hard. The simplest method is to measure the pulse rate at the wrist counting the number of beats for say 15 seconds and then multiplying by four to calculate beats per minute.

Rating of perceived exertion (RPE)

Rating of perceived exertion allows individuals to subjectively rate intensity during exercise, taking into account fitness level, fatigue and environmental factors. It is particularly valuable for assessing exercise intensity in individuals who have an altered heart rate responses to exercise (eg. cardiac patients on β-Blockers).

Edith Cowan university., (2014)

c) OVERVIEW OF FATIGUE AND PHYSICAL ACTIVITY

DEFINITION

Extreme tiredness resulting from mental or physical exertion or illness.

Oxford dictionary.,(2014)

Cancer-related fatigue is a subjective symptom of fatigue that is experienced by nearly all cancer patients.

National cancer Institute., (2014)

CAUSES

Fatigue in cancer patients may be caused by the following:

- Cancer treatment with chemotherapy, radiation therapy, and some biologic therapies.
- Anemia (a lower than normal number of red blood cells).
- Hormone levels that are too low or too high.
- Trouble breathing or getting enough oxygen.
- Heart trouble.
- Infection.
- Pain.
- Stress.
- Loss of appetite or not getting enough calories and nutrients.
- Dehydration (loss of too much water from the body, such as from severe diarrhea or vomiting).
- Changes in how well the body uses food for energy.
- Loss of weight, muscle, and/or strength.
- Medicines that cause drowsiness.
- Problems getting enough sleep.

- Being less active.
- Other medical conditions.

National cancer Institute.,(2014)

CAUSES OF FATIGUE DUE TO TREATMENT

- The need for extra energy to repair and heal body tissue damaged by treatment causing decreased physical activity.
- The build-up of toxic substances that are left in the body after cells are killed by cancer treatment.
- The effect of biologic therapy on the immune system.
- Changes in the body's sleep-wake cycle.

Fatigue caused by Chemotherapy

Fatigue during chemotherapy may be increased by the following:

- Decreased physical activity
- Pain.
- Depression.
- Anxiety.
- Anemia.

Some types of chemotherapy stop the bone marrow from making enough new red blood cells, causing anemia (too few red blood cells to carry oxygen to the body).

- Lack of sleep caused by some anticancer drugs.

Fatigue caused by Radiation

In men with prostate cancer, fatigue was increased by having the following symptoms before radiation therapy started:

- Decreased physical activity
- Poor sleep.
- Depression.

In women with breast cancer, fatigue was increased by the following:

- Working while receiving radiation therapy.
- Having children at home.
- Depression.
- Anxiety.
- Trouble sleeping.
- Younger age.
- Being underweight.
- Having advanced cancer or other medical conditions.

National cancer Institute., (2014)

DIAGNOSTIC EVALUATION:

The assessment process may include the following.

Physical examination

This is an examination of the body to check general signs of health or anything that seems unusual. Check for problems such as trouble breathing or loss of muscle strength. The patient's walking, posture, and joint movements will be checked.

Rating the level of fatigue

The patient is asked to rate the level of fatigue (how bad the fatigue is). The doctor may ask the patient to rate the fatigue on a scale from 0 to 10. Other ways to rate fatigue is by Fatigue Symptom Inventory scale.

The most common blood tests to check if the number of red blood cells is normal are:

- Complete blood count (CBC) with differential count.
- Peripheral blood smears.

- Other blood tests include a bone marrow aspiration and biopsy or a Coombs' test. Blood tests to check the levels of vitamin B_{12}, iron, and erythropoietin may also be done.

National cancer Institute., (2014)

ASSESSMENT OF FATIGUE

Fatigue as a sensation of exhaustion during or after usual activities, or a feeling of inadequate energy to begin these activities.

- History collection of fatigue also includes:
  - Psychological (e.g., psychiatric disorder)
  - Social (e.g., family problems)
  - Physiological factors (e.g., old age)
  - Occupational illness (e.g., workplace stress).

- Duration of fatigue is assessed as:
  - Recent fatigue (symptoms lasting <1 month),
  - Prolonged fatigue (symptoms lasting >1 month),
  - Chronic fatigue (symptoms lasting >6 months).

British Medical Journal., (2014)

MANAGEMENT

- Bupropion is an antidepressant that is being studied to treat fatigue in patients with or without depression.
- Dexamethasone is an anti-inflammatory drug being studied in patients with advanced cancer.
- L-carnitine is a supplement that helps the body make energy and lowers inflammation that may be linked to fatigue.
- Ginseng is an herb used to treat fatigue which may be taken in capsules of ground ginseng root.

Nutrition counseling

Many patients aren't able to eat normally and lose weight. This may be due to treatment-related nausea, vomiting, and lack of appetite.

Psychosocial measures

Behavioral techniques including cognitive therapy, relaxation, counseling, social support, hypnosis, and biofeedback can decrease fatigue. Therapies that aim to educate patients about fatigue and related factors help to reduce fatigue. Support groups and journaling may also decrease fatigue.

Exercise

Exercise (including walking) may help people with cancer feel better and have more energy. The effect of exercise on fatigue in cancer patients is being studied. One study reported that breast cancer survivors who took part in enjoyable physical activity had less fatigue and pain and were better able to take part in daily activities. In clinical trials, some patients reported the following benefits from exercise:

- More physical energy.
- Better appetite.
- More able to do the normal activities of daily living.
- Better quality of life.
- More satisfaction with life.
- A greater sense of well-being.
- More able to meet the demands of cancer and cancer treatment.

Moderate activity for 3 to 5 hours a week may help cancer-related fatigue. Patients may need to start with light activity for short periods of time and build up to more exercise little by little. Studies have shown that exercise can be safely done during and after cancer treatment.

Mind and body exercises such as qigong, tai chi, and yoga may help relieve fatigue. These exercises combine activities like movement, stretching, balance, and controlled breathing with spiritual activity such as meditation.

National cancer Institute., (2014)

PHYSICAL ACTIVITY

DEFINITION

Physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure.

World Health Organization., (2014)

ASSESSMENT OF PHYSICAL ACTIVITY

- ❖ History collection of physical activity also includes:
  - Job related physical activity.
  - Transportation physical activity.
  - Housework.
  - Recreation.
  - Time spent sitting.

Job related physical activity

Occupational physical activity was defined as work activity consisting mostly of walking while at work or doing heavy labor or physically demanding work of all participants.

Bill Hendricks., (2011)

Transportation physical activity

Active transportation refers to any form of human-powered transportation – walking, cycling, using a wheelchair, in-line skating or skateboarding. There are many ways to engage in active transportation, whether it is walking to the bus stop, or cycling to school/work.

Public health agency of Canada., (2009)

Housework

House work includes house maintenance, and caring for farm. Housework can burn an average of 250 calories per hour for a 150 lb.

Anka., (2014)

Recreation

Recreation includes sports and leisure time physical activity. People who engaged in leisure-time physical activity had life expectancy gains of as much as 4.5 years, appeared.

Cancer Association., (2014)

Time spent sitting

Regardless of exercise, too much sedentary time is linked to major disability

Marla Paul., (2014)

PART-II

SECTION A: **Studies related to incidence and prevalence of decreased physical activity and fatigue among patients with cancer.**

De Jong N et.al., (2004)conducted a longitudinal study to determine the prevalence of fatigue and the course of fatigue as a function of chemotherapy in breast cancer patients undergoing adjuvant chemotherapy in six hospitals, mainly in the south of the Netherlands. Patients were interviewed five times using the Multidimensional Fatigue Inventory and the Rotterdam Symptom Checklist. The internal consistency for the scales measured by Cronbach's α, average 0.84 (range 0.53–0.93). There was a significant impact of the number of treatments [$\Delta\chi^2$ (2) = 9.168, P <0.01] on physical fatigue.

Reitman J.S.et.al., (2006) conducted a prospective study on long term treatment upper limb morbidity and quality of life after sentinel lymph node biopsy for stage I or II breast cancer. 214 patients were retrieved from Groningen's University and Medical centre and the Martin Hospital Groningen. 57 patients under went SLNB (31%) and 124 patients underwent ALND (69%). The patients activity restriction was assessed with Groningen's activity restriction scale and analyzed through descriptive statistics. The result after 2 years revealed the mean change ± SD of Groningen's activity restriction scale as 0.2± 3.5 for SLNB (n= 57) and 2.5 ± 6.3 for ALNB (n= 124) and the mean difference 2.3 and P= 0.002. The perceived disability was significant.

Erik van Rossum.et.al., (2007) conducted a randomized control study with two parallel groups on effect of adenosine 5'-triphosphate (ATP) infusions in palliative home care. Patients were recruited through the Departments of Medical Oncology and Pulmonology of five hospitals in different regions in the Netherlands (Maastricht, Heerlen, Eindhoven and Utrecht). Differences over time between the two groups were appraised by repeated measurement analysis of covariance using SAS Proc Mixed version 9.1. The results revealed that

GARS scores of ADL showed-1.20 as the estimate and -6.12 to 3.72 at CI of 95% in the ATP group and -2.00 as the estimate and -6.88 to 2.84 at the CI of 95% in control group. The between group difference estimate is 0.80 and -0.80 to 2.40 at CI of 95% which showed a significant decrease in physical activity.

Adjunto.et.al., (2008) conducted a cross sectional study to identify the prevalence and predictors of fatigue in colorectal cancer (CRC) patients. Adult brazilians with primary colon and rectal cancer were recruited from four outpatient oncology services at Sao Paulo city one public two private and one both. The Piper Fatigue Scale was used to assess fatigue. The internal consistencies of the tool by Cronbach's alpha is 0.94. Univariate analysis was done. The findings showed that almost half of the patients (n=78; 49.7%) reported no fatigue at all (zero score). Mild, moderate and severe fatigue was reported by 37 (23.5%), 35 (22.4%) and 7 (4.4%) patients, respectively.

Elme.A.et.al., (2011) conducted a study to examine the impact of obesity and physical activity on the health and wellbeing of patients with breast cancer shortly after the adjuvant treatments. The study was done in University of Helsinki. A total of 537 women aged 35 to 68 years with newly-diagnosed breast cancer were enrolled into the exercise intervention study. The findings revealed that higher waist circumference (P=0.0011), triglyceride (P=0.020), insulin (P=0.0098), rate of metabolic syndrome (P=0.028), and lower HDL-cholesterol (P=0.012) and QoL (P<0.001) were associated with low physical activity.

Martine.M.Godendorp.et.al., (2012) conducted a longitudinal study on prolonged impact of chemotherapy on fatigue in breast cancer survivors. Breast cancer patients of stage 0 through II receiving radiation and chemotherapy before and after surgery and no other history of cancer for experimental group and non cancer patients for control group was recruited in Moffitt Cancer

Center and the University of Kentucky Chandler Medical Center. Fatigue level was assessed using Fatigue Symptom Inventory scale. Covariant analysis was done and the result showed that the relation between group membership and rates of scores at 2nd test approached significance for FSI severity scores (P ¼ .052) which revealed the prevalence of fatigue among breast cancer patients.

Guru Karthikeyan.et.al., (2013) conducted a cross-sectional study on the prevalence of fatigue among cancer patients receiving various anticancer therapies in SAIMS Medical College and MY Government Hospital, Madhya Pradesh, India. The study included a total 121 cancer patients receiving treatment and age group of above 15 years. The patients were assessed for severity of fatigue using Brief Fatigue Inventory (BFI) .The data collected was analyzed using SPSS 11.0 version. The findings revealed that out of 20 patients, who received radiotherapy, 10% (2) reported mild fatigue, 45% (9) reported moderate, and 45% (9) reported severe fatigue. Among patients who received chemotherapy only 1 patient (1.69%) reported moderate fatigue, while rest all the patients reported severe fatigue 98.30%. Among patients who received concurrent chemo-radiation, 4 patients reported (9.52%) mild fatigue and 5 patients reported moderate fatigue (11.90%) and 33 patients experienced severe fatigue (78.57%).

Brown.J.C.et.al., (2014) conducted a cross-sectional study to assess breast cancer survivors treated with aromatase inhibitors experiencing aromatase inhibitor associated musculoskeletal symptoms causing decreased physical activity in Pelelman school of medicine, Pennsylvania. The total number of sample is 300. Multivariate analysis was done. The findings revealed that aromatase inhibitor associated musculoskeletal symptoms (odds ratio [OR] = 2.29 [95% confidence interval [CI]: 1.36-3.86]) was associated with reductions in physical activity.

Wang.XS.et.al., (2014) conducted a longitudinal study on prevalence and characteristics of moderate to severe fatigue in the University of Texas with breast, prostate, colorectal, and lung cancer patients. The fatigue severity was assessed using M.D Anderson Symptom Inventory. Regression analysis identified that moderate and severe fatigue was reported by 983 of 2177 patients (45%) undergoing active treatment and was more likely to occur in patients receiving treatment with strong opioids (odds ratio [OR], 3.00) 29% of patients (150 of 515 patients).They had moderate and severe fatigue that was associated with poor performance status (OR, 3.48).

SECTION B: **Studies related to effectiveness of exercises on physical activity and fatigue among patients with cancer.**

Wilson.R.W.et.al.,(2005) conducted a pilot study on home based exercise program for sedentary cancer survivors treated with hematopoietic stem cell transplantation. Through convince sampling patients receiving stem cell therapy at least 6 months before the study was included from Moffitt cancer centre. Exercise was given three times per week for 20 minutes. The fatigue symptom inventory was used to assess the fatigue. Wilcoxson's signed rank test showed that the pre intervention mean score for severity, duration and inference was 3.9 (1.7), 2.9 (1.7), 15.3 (10.4) respectively. The post intervention mean score for severity, duration and inference was 2.9 (1.7), 2.0(2.0), 10.8 (12.1) respectively.

Margaret.L.Mc.Neely.et.al., (**2006)** conducted a randomized control trial on effect of exercise on breast cancer patients and survivors in the Cochrane Central Register. Studies were eligible only if they were RCTs comparing with a placebo including women with early to late stage (stage 0-III) breast cancer or who had undergone breast cancer surgery with or without adjuvant cancer therapy. Weighted mean differences (WMD) were used for analyzing uniform scale and standardized mean differences (SMD) was used

for different scales respectively. All results were calculated with 95% confidence intervals (CIs).The pooled results of all 4 studies showed a statistically significant increase in physical functioning and well-being from exercise (SMD 0.84, 95% CI 0.36 to 1.32). Exercise also significantly improved symptoms of fatigue (SMD 0.46, 95% CI 0.23 to 0.70).

Monga.U.et.al., (2007) conducted a prospective study on the effectiveness of exercise on fatigue and quality of life in prostate cancer patients undergoing radiotherapy. At post-radiotherapy assessment, the exercise group showed significant improvements in reducing fatigue (P=.02) and improving Functional Assessment of Cancer Therapy-Prostate (FACT-P) (P=.04). Within the control group, there was a significant increase in fatigue score (P=.004). Between-group differences at post-radiotherapy assessment in fatigue showed a significance of P<.001, FACT-P (P=.006).

Battaglini .C.L. et.al., (2008) conducted a study on effect of exercise on caloric intake of breast cancer patients undergoing treatment from Cochrane library. Twenty females recently diagnosed with breast cancer, scheduled to undergo chemotherapy or radiation, were assigned randomly to an experimental (N = 10) or control group (N = 10). Each exercise includes cardiovascular activity (6-12 min), followed by stretching (5-10 min), resistance training (15-30 min), and a cool-down (approximately 8 min). The findings revealed the fatigue levels (Spearman (18) = -0.541; P = 0.014). In conclusion, the results of this study suggest that an exercise intervention administered to cancer patients undergoing medical treatment may assist in the mitigation of some treatment side effects including increased fatigue.

Miranda Velthuis.et.al., (2010) conducted a longitudinal study on effect of exercises on breast cancer patients selected through randomized control trial. The variables physical activity and fatigue was assessed through Fatigue Symptom Inventory and EORT-C respectively. The exercise is given

twice a week in out patient department and for 18 weeks according to the patients convenience for one hour. The data was analyzed through descriptive statistics there was significant reduction of cancer-related fatigue in favor of the exercise groups (Standardized Mean Difference 0.30, 95% CI 0.09 to 0.51).

Justin C.Brown.et.al., (2010) conducted a meta-analysis to explore the efficacy of exercise as a nonpharmacologic intervention to reduce cancer-related fatigue (CRF) among adult cancer survivors in university of Connecticut. The 44 studies which were included used randomized control trial design. The result showed that Cancer survivors in exercise interventions reduced their CRF levels to a greater extent than usual care controls, $d_+ = 0.31$ (95% CI = 0.22–0.40). CRF levels improved in direct proportion to the intensity of resistance exercise ($\beta = 0.60$, P = 0.01), a pattern that was stronger in higher quality studies ($\beta = 0.23$, $P < 0.05$).

Saskia F.et.al., (2010) conducted an evaluative study on the effect of behavioral techniques and physical exercise on psychosocial functioning and health-related quality of life (HRQoL) outcomes in breast cancer patients and survivors. Randomized control trial was used. The analysis was done through standard meta-analytic procedures using the Stata statistical software package. The effect of physical exercise on fatigue was investigated in 11 studies. A summary effect size of -0.315 was found (95% CI -0.532 to -0.098, p50.004), which indicates a positive effect of this intervention on fatigue [53–60, 62, 63, 68]. A summary effect size of 0.298 was found (95% CI 0.117 to 0.479, p50.001).Contrary to behavioral techniques; physical exercise has a positive effect.

Macmillan. E.M.et.al., (2011) conducted a meta-analysis exercise as a treatment modality for reducing cancer-related fatigue cancer patients and survivors. A total of 16 studies, representing 1426 participants (exercise, 759; control, 667) were included in a meta-analysis using a fixed-effects model. The

standardized mean difference effect size (SMD) was used to test the effect of exercise on CRF between experimental and control groups. The results indicate a small but significant effect size in favour of the use of exercise interventions for reducing CRF (SMD 0.26, P < 0.001). Furthermore, aerobic exercise programs caused a significant reduction in CRF (SMD 0.21, P < 0.001) and overall, exercise was able to significantly improve aerobic and musculoskeletal fitness compared with control groups (P < 0.01).

Miranda R. Andrus et.al., (2012) conducted a longitudinal study in The National Center for Education Statistics surveyed more than 26,000 randomly selected Americans and provided a detailed picture of their literacy skills to represent the country as a whole the descriptive statistics showed that those who read at or below the 4^{th} grade level had a mean physical sickness impact profile score of 6.54 compared with a mean score of 2.48 in those whose reading level was above the 4^{th} grade level (P< 0.0008). The illiteracy rate was also found to be associated with the area of residence especially among Caucasian Americans. This relationship remained significant after adjusting for confounding variable (P<0.002).

Cramp F.Byron.et.al., (2012) conducted a randomized control study on exercise for the management of cancer-related fatigue in adults. The review was done in the Cochrane library. The 38 comparisons provided data for 1461 participants who received an exercise intervention and 1187 participants in the control arm. At the end of the intervention period exercise was statistically more effective than the control intervention (standardized mean difference (SMD) -0.27, 95% confidence interval (CI) -0.37 to -0.17) with moderate statistical heterogeneity identified (P = 0.03; I2 = 33.0%).

Jeffrey.J.Houlton.et.al., (2013) conducted a study on long-term effects of personalized physical therapy programme on shoulder function in 75 head and neck cancer patients. Daily activity restrictions were evaluated with

Groningen Activity Restriction Scale (GARS), the Fatigue Symptom Inventory (FSI) were used to quantify perceived levels of fatigue. The Wilcoxon Signed Rank Test with P<0.05 showed a reduction in fatigue and improvement in physical activity.

Hammer.S.M.et.al., (2014) conducted a study through survey method on Cancer-related impairments influencing physical activity in uterine cancer survivors. The samples were uterine cancer survivors. PA was calculated using MET-hours per week (MET·h·wk). The results revealed that among the 213 study participants, 40%, 13%, 13%, 12%, and 23% reported participating in <3.0, 3.0-8.9, 9.0-17.9, 18.0-26.9, and ≥27.0 MET·h·wk of PA, respectively. Walking is the preferred mode of exercise for physically active uterine cancer survivors. Of the survivors, 53% experience at least one PFI. The most common PFI is lower limb lymph edema (36.2%), followed by general pain (22.5%). The OR of PFI decreased as MET-hours per week of PA increased (OR, 0.51; 95% confidence interval, 0.31-0.84; P = 0.009).

Naraphong.W.et.al., (2014) conducted pilot study on the effectiveness of exercise on fatigue among breast cancer patients in Thailand university. Twenty-three eligible women were randomly assigned to either an experimental group (n=11) or to a control group (n=12). Data were collected and analyzed at baseline and again at 4, 7, and 10 weeks. Using generalized estimating equations analysis, a significant decrease in mood disturbance was found in the exercise group compared with control at 10 weeks (β=0.03, P=0.04). The participants exhibited significantly longer 12-minute walk distance at 10 weeks than those in the control group (t=2.28, P=0.04). These results indicate that exercise during adjuvant chemotherapy may be beneficial for Thai women with breast cancer

Banzer.W.et.al., (2014) conducted a metaanalysis to explore the interdependence of changes in oxygen uptake, quality of life and cancer related side effect fatigue during a 4 month exercise intervention. The ANCOVA, with significant covariate effect for pretest fatigue score [F(5,101) = 8.150, P < 0.001], indicated significant differences between groups in outcome measures (P<0.001). Related fatigue reduction (-6.1±30.7; -11.5± 20.9;-21.2 ± 21.4 points) between upper and lower tercile. The findings point towards a relationship of exercise capacity enhancement, quality of life improvement and fatigue symptom reduction during and shortly after cancer treatment

Sarrto.T.et.al.,(2014) The study aimed at determining whether physical exercise training improves physical fitness of breast cancer survivors. A total of 573 breast cancer survivors were randomized into an exercise or a control group, 12-months after adjuvant treatments. The meta analysis showed that the amount of physical activity increased from baseline to 12 months by 3.10 (95% CI=0.46 to 5.74) MET-h/wk in the exercise group and by 3.57 (95% CI=0.71 to 6.42) MET-h/wk in the control group, and the increases were similar between groups [between-group training effect 0.47 (95% CI=–3.40 to 4.34) MET-h/wk; p=0.97].

SECTION C : Studies related to Nurses role on Physical activity among patients with cancer.

Graydon.JE.et.al.,(2013) conducted a study to determine which strategies are most effective in relieving fatigue among women undergoing treatment for cancer in the university of Toronto. At each interview, the subjects completed the Pearson Byars Fatigue Feeling Checklist and the Fatigue Relief Scale. Exercise was effective at P < 0.0001. The results of the study provide nurses with some guidance as to strategies they might suggest to patients who experience fatigue.

O'Hanlon E.et.al., (2014) conducted a survey on knowledge about the effectiveness of exercise in cancer care among oncology nurses in Irish association for nurses and Charted physiotherapist in Oncology in Ireland. The response rate was 74% (26/35) for physiotherapists and 34% (58/170) for oncology nurses. Three quarters (81%) of physiotherapists had knowledge about its effectiveness and only 33% (18/54) of oncology nurses felt they had sufficient knowledge regarding exercise in cancer care.

CHAPTER - III
METHODOLOGY

This chapter includes research approach, research design, research setting, population, sample, criteria for selection of sample, sampling procedure, description of the tool, scoring procedure, validity, reliability, pilot study, and method of data collection and plan for data analysis and protecting the human subjects.

RESEARCH APPROACH

An evaluative approach was used for this study.

RESEARCH DESIGN

The quasi experimental non equivalent pre test and post test control group only research design was adopted to assess the effectiveness of exercises among patients with cancer.

Schematic representation

GROUP	PRE TEST	INTERVENTION	POST TEST
Experimental group	O_1	X	O_2
Control group	O_1	-	O_2

O_1 - Collection of demographic data, pretest to assess the physical activity and fatigue among patients with cancer in experimental group and control group.

X - Exercises were given for 30 minutes once in a day for a period of 15 days in experimental group.

O_2 - Post test to assess the physical activity and fatigue among patients with cancer in experimental and control group.

RESEARCH SETTING

The study was conducted in Erode Cancer Centre at Erode. It is a 55 bedded hospital with radiation and chemotherapy facilities. The monthly inpatient and outpatient census is 45 and 1500 for radiation and consultation respectively. The daily outpatients are 50 and inpatients are 40. Patients are admitted in the hospital for radiation therapy and the duration of the cycle is 21 days, chemotherapy for one week or both for radiation and chemotherapy depending on the patient's condition. Operation theater facilities are available. The hospital has a ground floor where reception, outpatient department, laboratory, radiation room, a ward used for both emergency and administering vitamin B 12 for patients after radiation and an extension for brachytherapy. The first floor consists of Managing Director room, outpatient department, operation theater, ICU with two beds, research unit, special ward with 8 rooms and in the extension room there are 4 beds. The second floor consist of general ward for both chemotherapy and radiation patients. The hospital is also equipped with a high end External Beam Radiation Therapy, Treatment planning system, Mould Room, Brachytherapy, Surgical Oncology, Medical Oncology, Palliative Care and Diagnostic facilities also.

POPULATION

The target population selected for the study was patients who were diagnosed with cancer.

SAMPLE

Patients with cancer who were admitted in Erode Cancer Center at Erode.

CRITERIA FOR SELECTION OF SAMPLE

INCLUSION CRITERIA

- Patients with age group of 20 to 45 years.
- Both male and female patients.

- Patients who were admitted in the inpatient department for a minimum stay of 15 days diagnosed for cancer.
- Patients receiving chemotherapy and radiation therapy.

EXCLUSION CRITERIA

- Musculoskeletal, neurological and cardiovascular disorder that limits participation.
- Severe anemia (Hb 6.5-8 g/dl).
- Patients admitted for surgery.
- Metastasis.
- Critically ill.

SAMPLE SIZE AND SAMPLING PROCEDURE

SAMPLE SIZE

The sample size for the study consists of 60 samples, 30 were in experimental group and 30 were in control group.

SAMPLING TECHNIQUE

Non probability purposive sampling technique was used to select the samples for the study from Erode cancer center.

INSTRUMENT AND SCORING PROCEDURE

INSTRUMENT

The tool consists of four parts.

PART-I

It consists of demographic variable such as the age, sex, type of family, education, occupation, religion, family monthly income, area of residence, duration of treatment.

PART-II

The Groningen Activity Restriction Scale is a standardized instrument which consists of 11 questions used to assess the level of physical activity. The questions have different number of possible responses and each response have different graded points. The questions are graded as1 to 4 as follows:

SCORES	DESCRIPTION
1	Client can do activities without any difficulty.
2	Client can do activities fully independently but with some difficulty.
3	Client can do activities fully independently but with great difficulty.
4	Client needs complete help to do the activity.

The maximum possible score is 44.

PART-III

It consists of The Fatigue Symptom Inventory scale to assess the level of fatigue. It consists of 11 statements. Each response is graded in points ranging from 0 to 10 by using the numerical rating scale. Questions 1-4 are rated as 0 which means not at all fatigued and 10 as fatigued as I could be. Questions 5 -10 is rated as 0- no interference and 10- extreme interference. Maximum score is 110.

SCORING PROCEDURE

Part II

The Groningen's Activity Restriction Scale is having 11 questions graded as 1, 2, 3 and 4. The maximum score is 44 and it is interpreted as below:

GRONINGEN ACTIVITY RESTRICTION SCALE	SCORES	PERCENTAGE
Active	0-11	0-25%

Sufficiently active	12-21	26-50%
Insufficiently active	22-32	51- 75%
Inactive	33-44	76- 100%

Minimum score 11 indicates the client is highly active and the highest score 44 indicates the client is inactive.

Part III

The Fatigue Symptom Inventory scale consists of 11 questions. Each question is rated from 1 to 10. The maximum score is 110 which is interpreted as follows:

FATIGUE SYMPTOM INVENTORY	SCORES	PERCENTAGE
No fatigue	0	0%
Mild fatigue	1-36	0-25%
Moderate fatigue	37-65	26-50%
Severe fatigue	66-85	51-75%
Excessive fatigue	86-110	76-100%

The minimum score is 0 which is interpreted as No fatigue and the maximum score 110 is interpreted as Excessive fatigue.

VALIDITY AND RELIABILITY OF THE TOOL

Validity

The validity of the tool was established in consultation with 4 nursing experts and one oncologist. It was modified according to the suggestion and recommendation of the experts.

Reliability

The reliability of the tool was found by checking the internal consistency of the tool using Cronbach's alpha formula. The internal consistency for Groningen's Activity Restriction Scale was (r=0.97) and Fatigue Symptom Inventory scale was (r=0.96).

PILOT STUDY

The Pilot study was conducted in Erode cancer centre for a period of 2 weeks. The researcher obtained permission from the institution and from the participants, prior to the study and the purpose of the study was explained to the subjects. The pilot study was conducted for a period of 2 weeks. The data was collected by using structured interview schedule from 10 samples, 5 patients in experimental group and 5 patients in control group. On the 1st day pretest was done and exercises were taught to the patients in the experimental group. The patients continued to do the exercises for 15 days under supervision. Each session lasted for about 30 minutes per day. On the 15th day post test was conducted for the experimental group, whereas in control group pretest was done on the 1st day and on the 15th day post test was conducted using the same scale.

Data was analyzed and the findings of the pilot study showed that for physical activity in paired t test the paired 't' value was 5.28 which was significant at $P<0.05$ level and for fatigue the paired 't' value was 102.8 which was significant at $P< 0.05$ level in experimental group. For physical activity the independent 't' value was 3.10 which was significant at $P< 0.05$ level and for fatigue the independent 't' value was 5.4 which was significant at $P<0.05$ level between experimental and control group. The pilot study revealed that the study was feasible and practicable to conduct the main study.

DATA COLLECTION PROCEDURE

The main study was conducted in Erode Cancer Centre at Erode. Data collection was done for a period of 6weeks. The investigator obtained written permission from the Managing Director of Erode Cancer Center at Erode. The oral permission was obtained from each participant prior to the study. Based on the inclusion criteria 60 samples were selected by using purposive sampling

technique. From the first day samples were collected for experimental group. Per day 5-6 samples were collected till the samples were 30.

On the 1st day, in experimental group data pertaining to the demographic variables was collected by using structured interview schedule then the pre test was conducted to the participants by using Groningen's Activity Restriction Scale for assessing the level of physical activity, Fatigue Symptom Inventory scale was used to assess the fatigue. The exercises were given to the participants which were carried out as a single session (30 minutes) per day for 15 days. After the intervention post test was conducted on the 15th day using the same scale. After completing the experimental group from 21st day onwards 5-6 samples were collected each day for control group. The same procedure was carried out until the samples were 30.On the first day demographic variables was collected by using structured interview schedule then pre test was conducted to the participants by using Groningen's Activity Restriction Scale for assessing physical activity, Fatigue Symptom Inventory scale for assessing fatigue. On the 15th day post test was conducted using the same scale in control group.

PLAN FOR DATA ANALYSIS

Descriptive and inferential statistics were used for data analysis.

S. No	Data Analysis	Method	Purpose

1.	Descriptive statistics	Frequency, percentage, Mean, Standard deviation	To describe the demographic variables of patients with cancer. To assess the pre test and post test level of physical activity among patients with cancer in experimental group and control group. To assess the pre test and post test level of fatigue among patients with cancer in experimental group and control group.
2.	Inferential statistics	Paired 't' test	Comparison between the pre test and post test level of physical activity and fatigue among patients with cancer in experimental and control group.
		Independent 't' test	To find the effectiveness of exercises on physical activity and fatigue among patients with cancer between experimental and control group.
		'Chi square' test	To find the association between the post test level of physical activity and fatigue among patients with cancer and their selected demographic variables in experimental group.

PROTECTING THE HUMAN SUBJECTS

The research proposal was approved by the dissertation committee prior to the main study. The written permission was obtained from the Managing Director of Erode Cancer Centre at Erode. Oral consent was obtained from each sample before starting the data collection and their datas were kept confidential.

CHAPTER - IV
DATA ANALYSIS AND INTERPRETATION

This chapter deals with the analysis and interpretation of the data collected to assess the effectiveness of exercises on physical activity and fatigue among patients with cancer in Erode Cancer Centre, Erode.

ORGANIZATION OF DATA

The data collected were analyzed, tabulated and organized as follows:

SECTION A: Distribution of demographic variables of patients with cancer in experimental and control group.

SECTION B: Assess the pre test and post test level of physical activity among patients with cancer in experimental and control group.

SECTION C: Assess the pre test and post test level of fatigue among patient with cancer in experimental and control group.

SECTION D: Comparison between the pre test and post test level of physical activity among patients with cancer in experimental group.

SECTION E: Comparison between the pre test and post test level of fatigue among patients with cancer in experimental group.

SECTION F: Assess the effectiveness of exercises on physical activity among patients with cancer between experimental and control group.

SECTION G: Assess the effectiveness of exercises on fatigue among patients with cancer between experimental and control group.

SECTION H: Find the association between post test levels of physical activity among patients with cancer and their selected demographic variable in experimental group.

SECTION I: Find the association between post test levels of fatigue among patients with cancer and their selected demographic variables in experimental group.

SECTION A: DISTRIBUTION OF DEMOGRAPHIC VARIABLES OF PATIENTS WITH CANCER.

TABLE 1 : Frequency and percentage distribution of demographic variables among patients with cancer in experimental group and control group.

n_1 = 30, n_2= 30

S. No	Demographic variables	Experimental group		Control group	
		f	%	f	%
1	**Age**				
	a) 20- 25	-	-	-	-
	b) 26- 30	1	3.3%	1	3.3%
	c) 31- 35	3	10%	1	3.3%
	d) 36- 40	2	6.7%	2	6.7%
	e) 41- 45	24	80%	26	86.7%
2	**Sex**				
	a) Male	9	30%	10	33.3%
	b) Female	21	70%	20	66.7%
3	**Type of family**				
	a) Nuclear	27	90%	28	93.3%
	b) Joint	3	10%	2	6.7%
4	**Education**				
	a) Illiterate	8	26.7%	12	40%
	b) Primary	13	43.3%	12	40%
	c) High school	6	20%	2	6.7%
	d) Higher secondary	2	6.7%	4	13.3%
	e) Graduate	1	3.3%	-	-

S. No	Demographic variables	Experimental group		Control group	
		f	%	f	%
5	**Occupation**				
	a) Coolie	14	46.7%	20	66.7%
	b) Private	4	13.3%	9	30%
	c) Government	2	6.7%	1	3.3%
	d) Self employed	1	3.3%	-	-
	e) Unemployment	9	30%	-	-
6	**Religion**				
	a) Hindu	28	93.3%	30	100%
	b) Muslim	2	6.7%	-	-
	c) Christian	-	-	-	-
	d) Others	-	-	-	-
7	**Family monthly income**				
	a) Rs.2000- 4000	23	76.7%	18	60%
	b) Rs.4001- 6000	3	10%	9	30%
	c) Rs.6001-8000	3	10%	2	6.7%
	d) Above 8001	1	3.3%	1	3.3%
8	**Area of residence**				
	a) Urban	4	13.3%	3	10%
	b) Rural	26	86.7%	27	90%
9	**Duration of treatment**				
	a) 0-12 months	27	90%	28	93.3%
	b) 13-24 months	3	10%	2	6.7%
	c) 25- 36 months	-	-	-	-
	d) 37- 48 months	-	-	-	-
	e) 49- 60 months	-	-	-	-
	f) More than 60 months	-	-	-	-

Table 1 showed the distribution of demographic variables among patients with cancer in both experimental group and control group.

Regarding age, in experimental group, 24(80%) belong to the age group of 41-45 years, 3(10%) belong to the age group of 31- 35 years, 2(6.7%) belong to the age group of 36- 40 years, 1(3.3%) belong to the age group of 26-30 years. In control group, 26(86.7%) belong to the age group of 41-45 years, 2(6.7%) belong to the age group of 36- 40 years, 1(3.3%) belong to the age group of 26- 30 years, 1(3.3%) belong to the age group of 31- 35 years. **Fig (2)**

With regard to sex, in experimental group, 21(70%) were females and 9(30%) were males. In control group, 20(66.7%) were females and 10(33.3%) were males. **Fig (3).**

Regarding the type of family in experimental group 27 (90%) were from nuclear family and 3(10%) were from joint family. In control group 28(93.3%) were from nuclear family and 2(6.7%) were from joint family.**Fig (4).**

With regard to educational in experimental group, majority of the patients 13(43.3%) had primary education, 8(26.7%) were illiterates, 6 (20%) had high school education, 2(6.7%) had higher secondary education and 1(3.3%) were graduates. In control group, majority of the patients 12(40%) were illiterates, 12(40%) had primary education, 2(6.7%) had high school education, 4(13.3%) had higher secondary education. **Fig (5).**

Regarding occupation in experimental group, majority 14(46.7%) were coolie,9(30%) were unemployed, 4(13.3%) were private employee and 2(6.7%) was government employee, 1(3.3%) were self employed. In control group majority 20(66.7%) were coolie, 9(30%) were private employee, 1(3.3%) were government employee. **Fig (6).**

Regarding religion in experimental group, majority 28(93.3%) belonged to Hindu religion, 2(6.7%) belonged to Muslim religion. In control group majority 30(100%) belonged to Hindu religion. **Fig (7).**

With regard to family monthly income, in experimental group majority 23(76.7%) were in between Rs.2000-Rs.4000, 3 (10%) were in between Rs.4001-Rs.6000, 3 (10%) were in between Rs.6001-Rs.8000, and 1(3.3%) was above Rs.8000. In control group majority 18(60%) were in between Rs.2000-Rs.4000, 9(30%) were in between Rs.4001-Rs.6000, 2 (6.7%) were between Rs.6001- 8000, and 1(3.33%) was above Rs.8000.**Fig (8).**

With regard to area of residence, in experimental group, majority 26(86.7%) were in rural area and 4(13.3%) were in urban area. In control group majority 27(90%) were in rural area and 3(10%) were in urban area. **Fig (9).**

With regard to duration of treatment, in experimental group, majority 27(90%) were getting treatment for a period of 0- 12 months, 3(10%) were getting treatment for a period 13- 24 months. In control group 28(93.3%) were getting treatment for a period of 0- 12 months, 2(6.7%) were getting treatment for a period 13- 24 months**. Fig (10)**

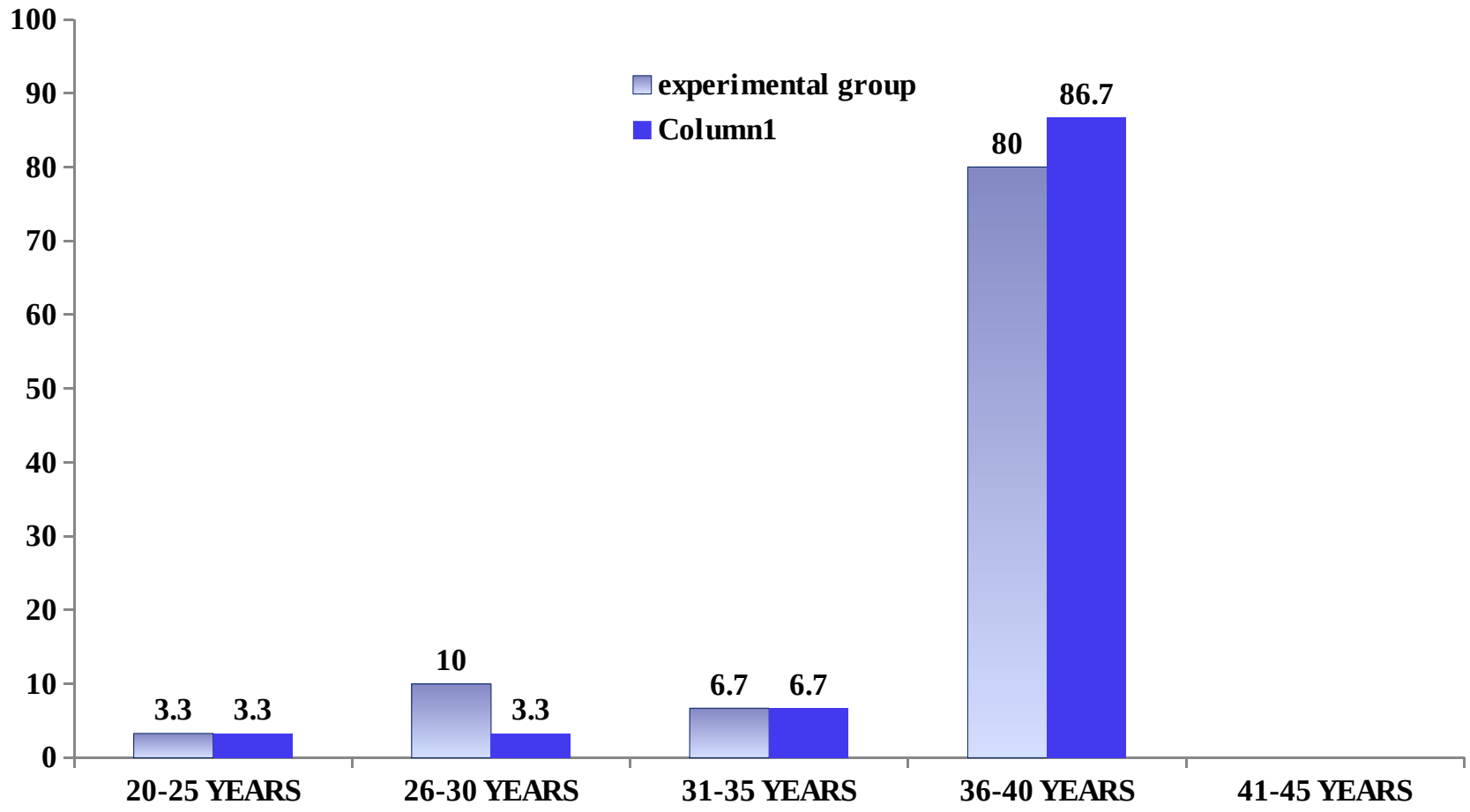


Figure 2: Percentage distribution of patients with cancer according to their age in experimental and control group.

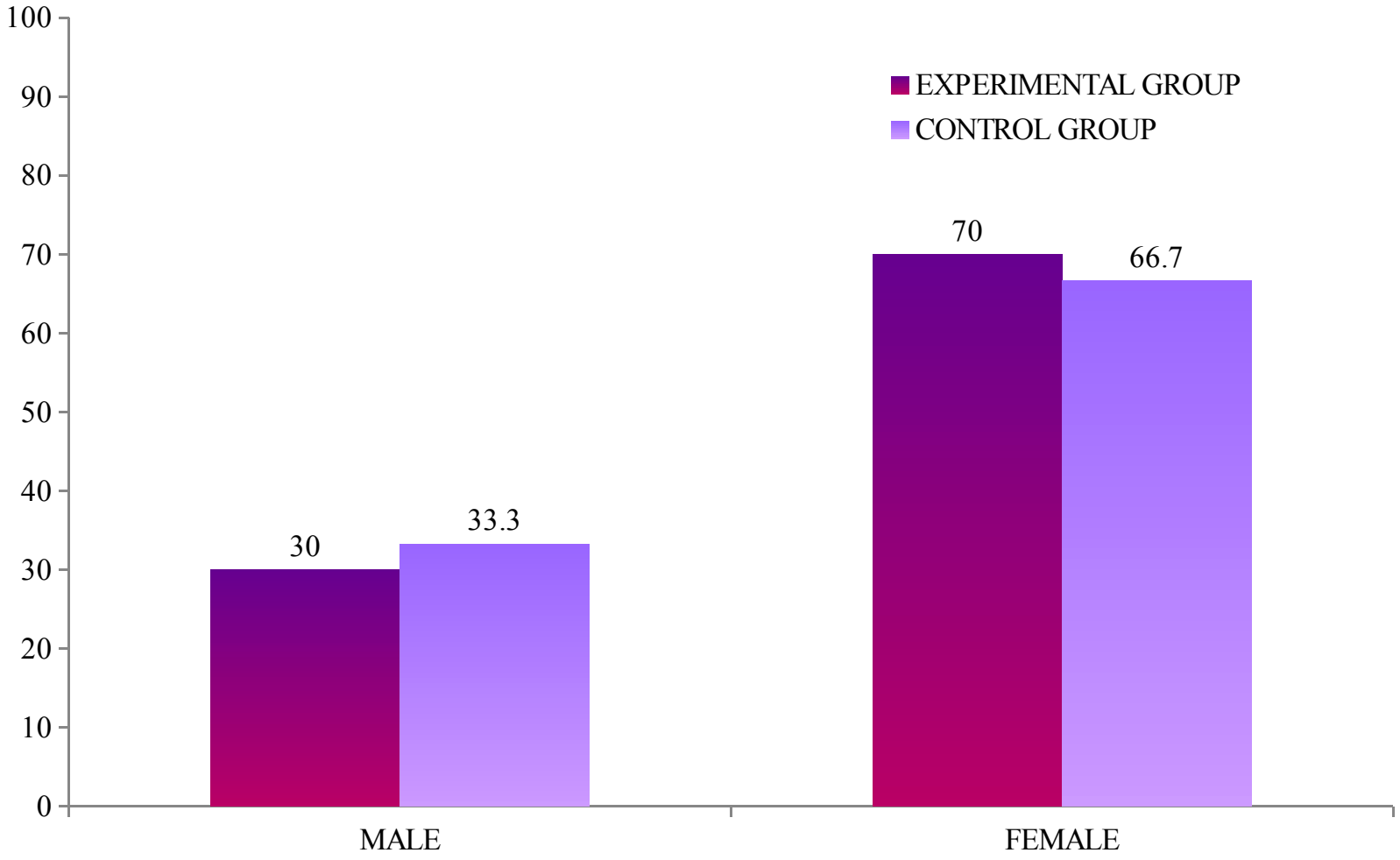


Figure 3: Percentage distribution of patients with cancer according to their sex in experimental and control group

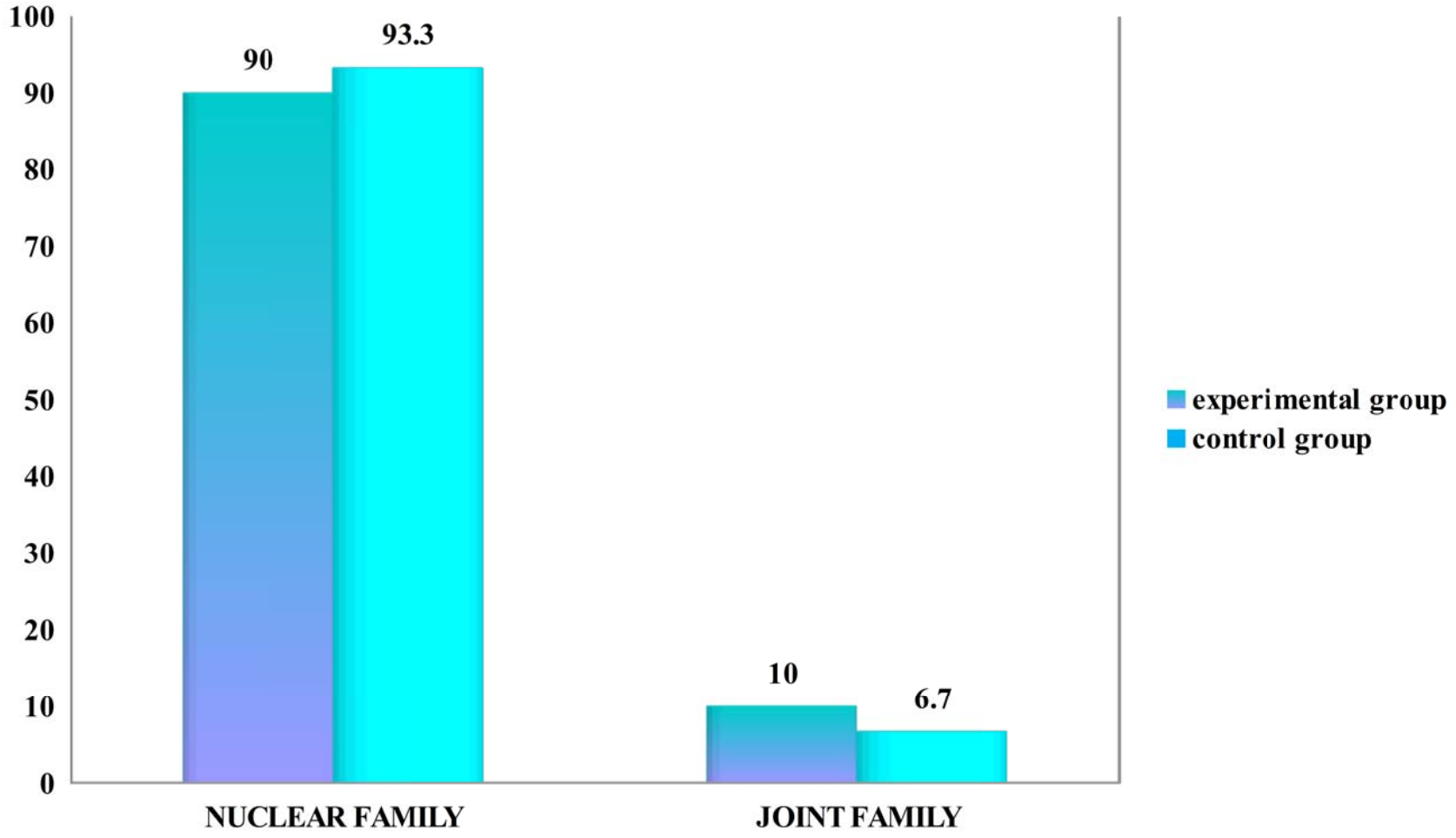


Figure 4: Percentage distribution of patients with cancer according to their type of family in experimental and control group

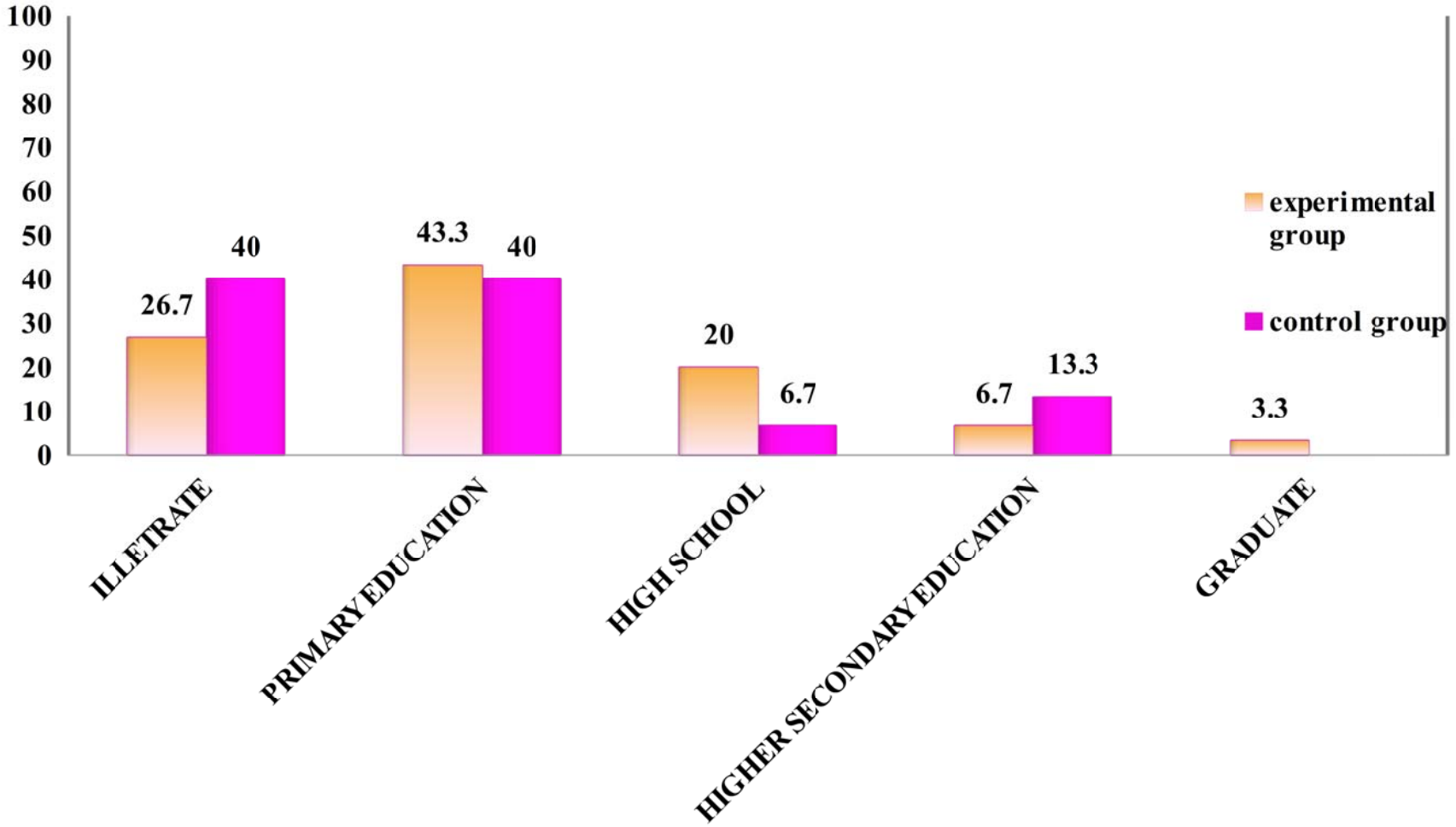


Figure 5: Percentage distribution of patients with cancer according to their education in experimental and control group

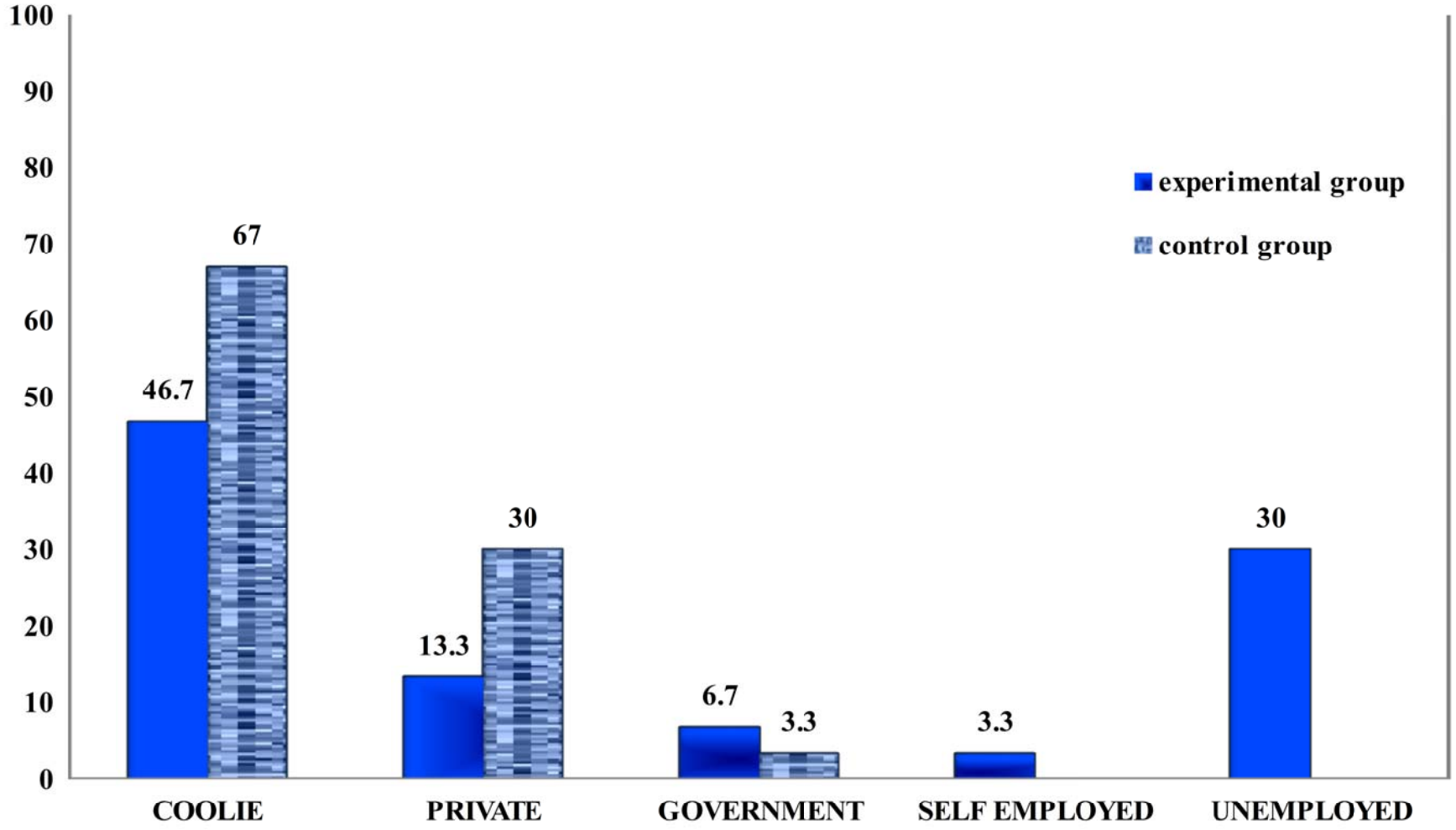

100
90
80
70
60
50
40
30
20
10
0
experimental group
control group
46.7
67
13.3
30
6.7
3.3
3.3
30
COOLIE
PRIVATE
GOVERNMENT
SELF EMPLOYED
UNEMPLOYED

Figure 6: Percentage distribution of patients with cancer according to their occupation in experimental and control group

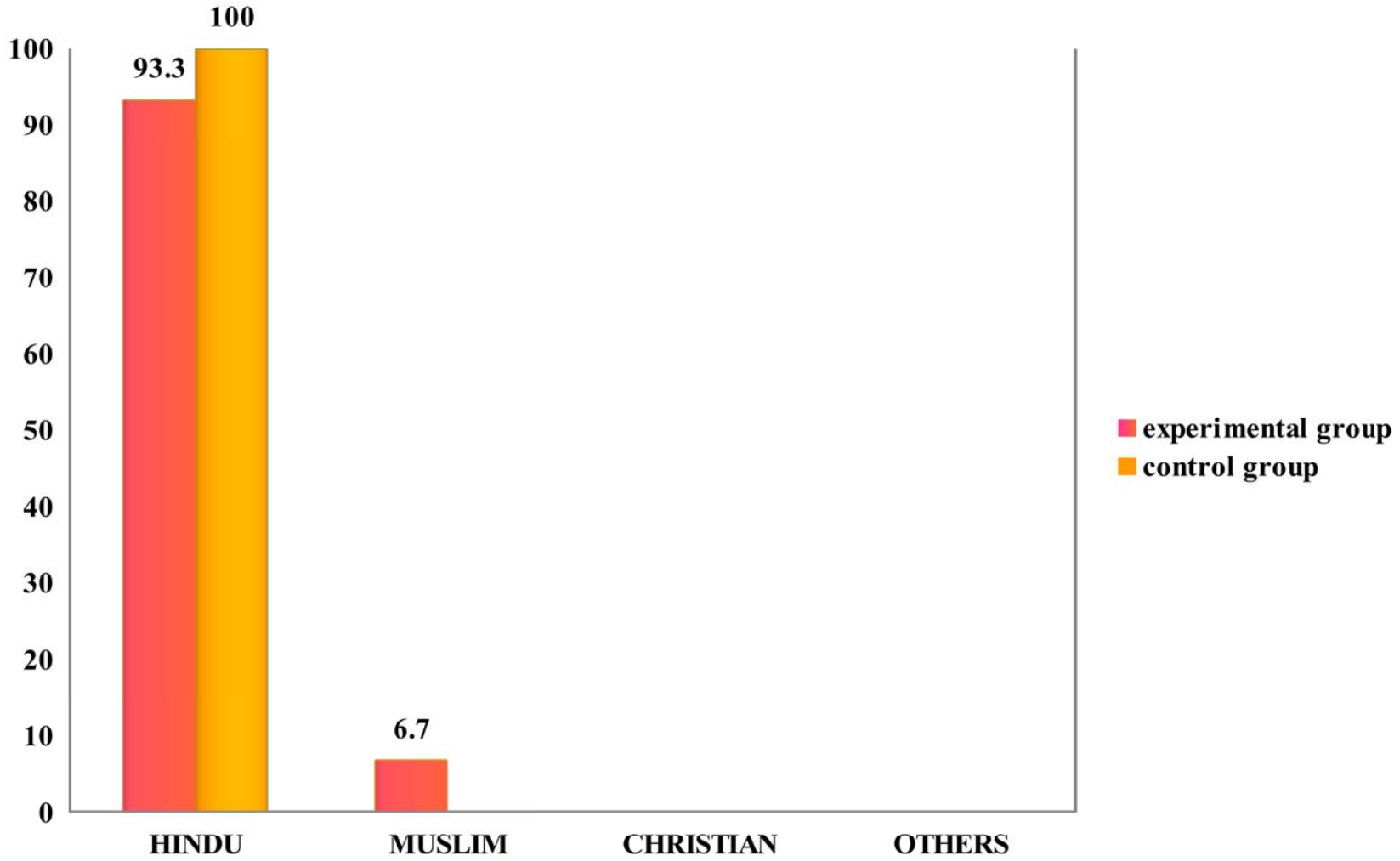

100
90
80
70
60
50
40
30
20
10
0
93.3
100
6.7
HINDU
MUSLIM
CHRISTIAN
OTHERS
experimental group
control group

Figure 7: Percentage distribution of patients with cancer according to their religion in experimental and control group

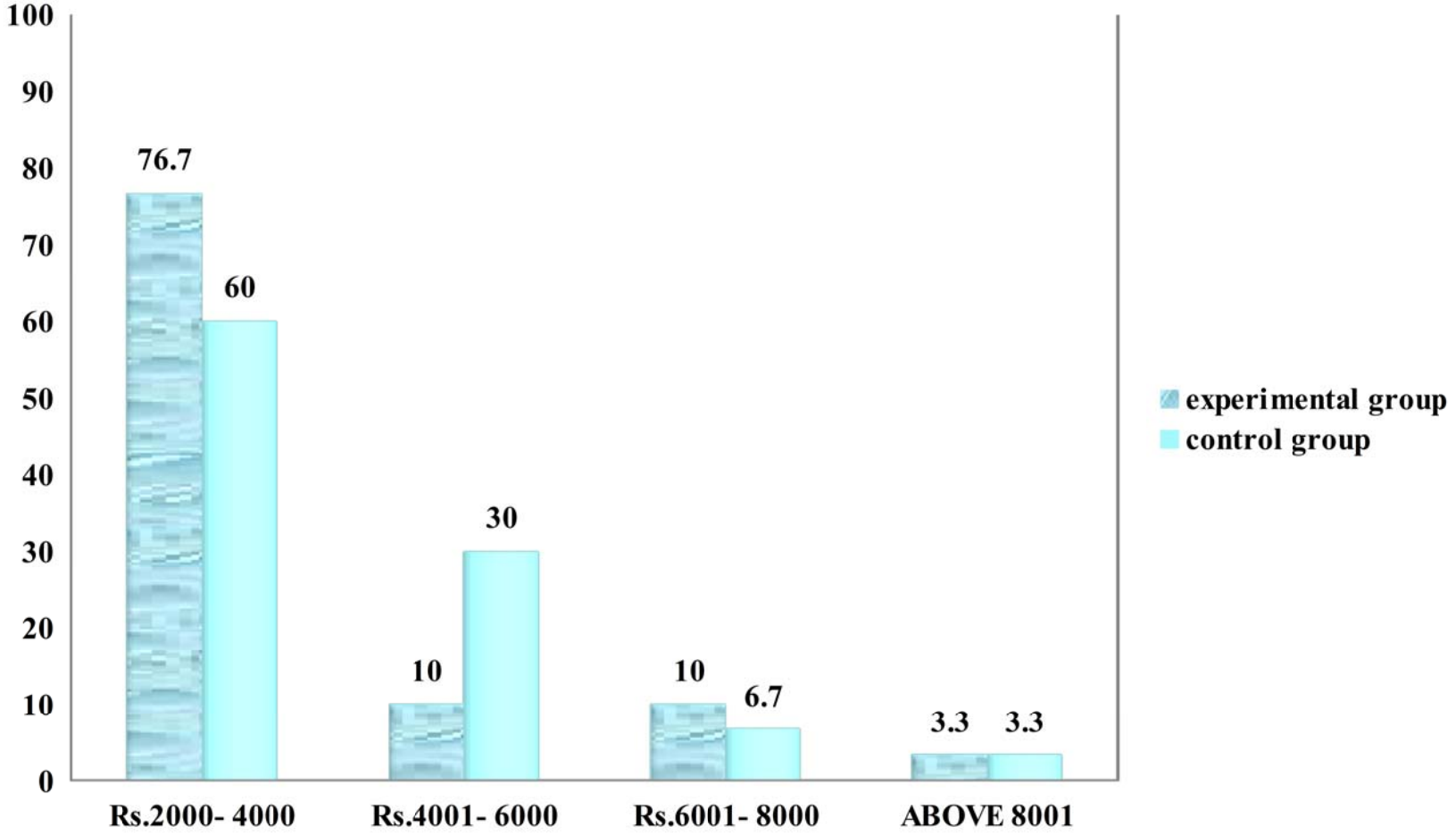


Figure 8: Percentage distribution of patients with cancer according to their family monthly income in experimental and control group

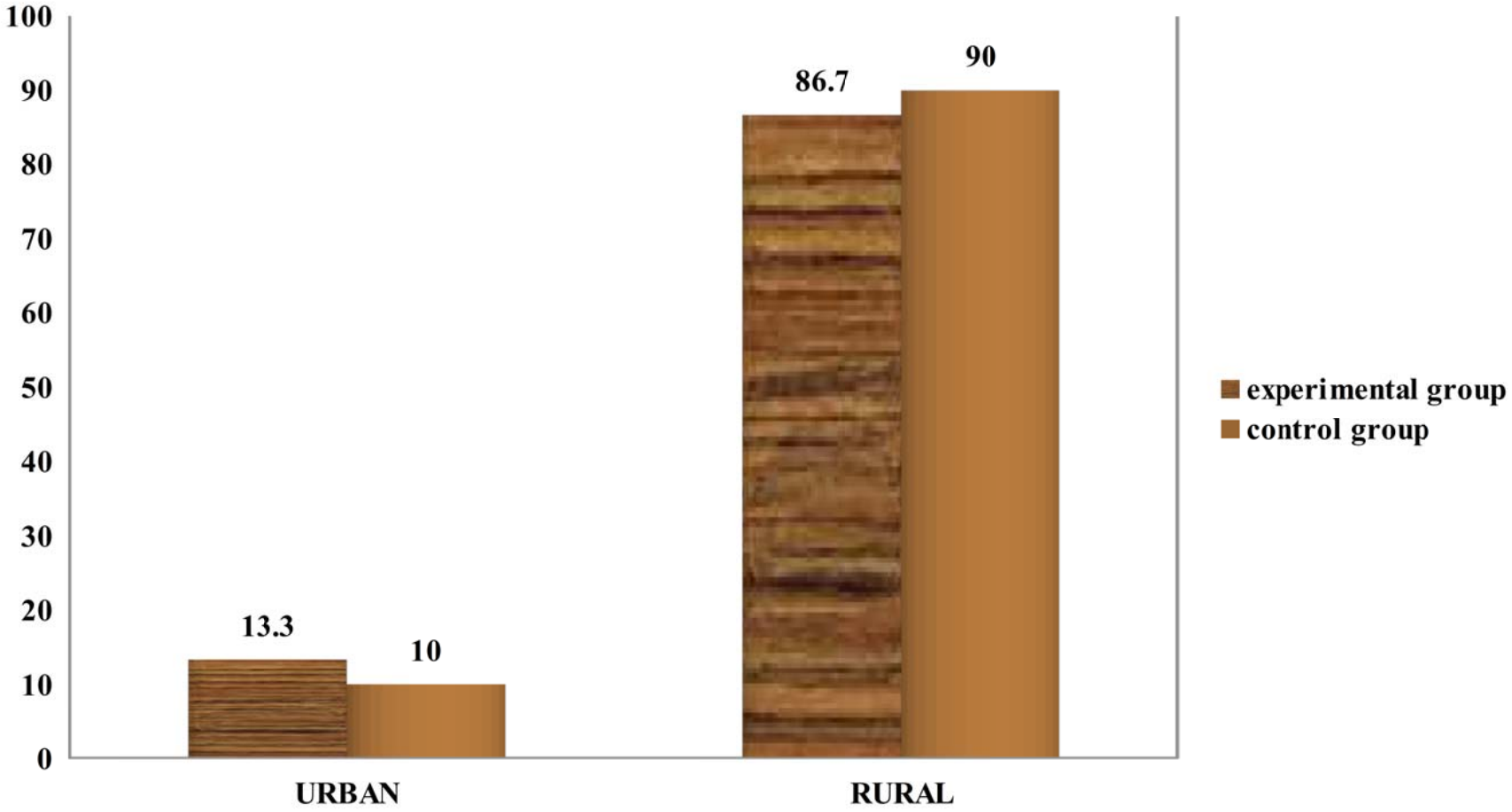


Figure 9: Percentage distribution of patients with cancer according to their area of residence in experimental and control group

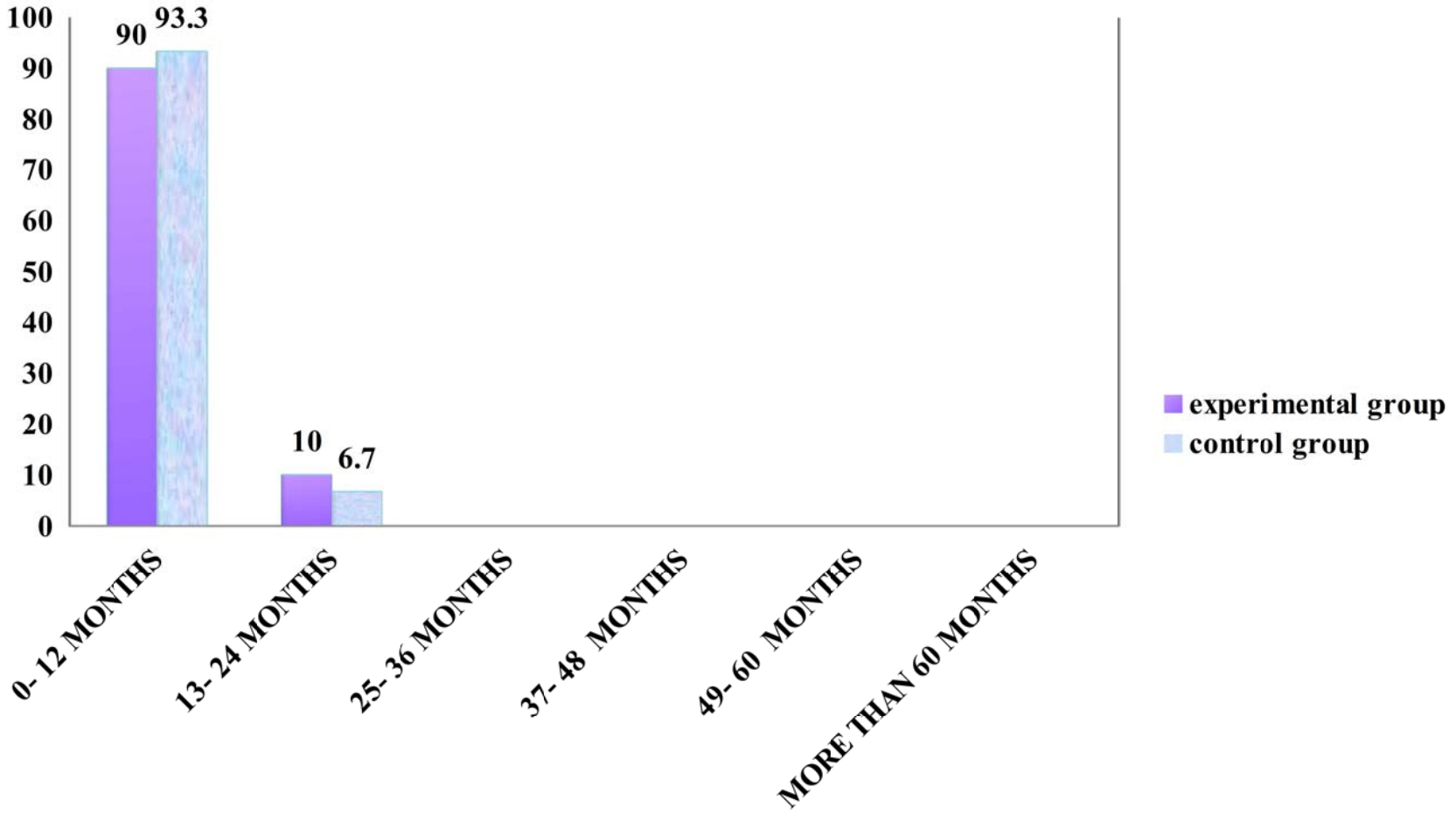


Figure 10: Percentage distribution of patients with cancer according to their duration of treatment

in experimental and control group

SECTION B: **ASSESS THE PRE TEST AND POSTTEST LEVEL OF PHYSICAL ACTIVITY AMONG PATIENTS WITH CANCER IN EXPERIMENTAL AND CONTROL GROUP.**

TABLE 2 : **Frequency and percentage distribution of pre test and post test level of physical activity among patients with cancer in experimental group and control group.**

n_1=30, n_2=30

S. No	Level of physical activity	Pre test				Post test			
		Experimental group		Control group		Experimental group		Control group	
		f	%	f	%	f	%	f	%
1	Active	-	-	2	7%	16	54%	2	7%
2	Sufficiently active	6	20%	10	33%	13	43%	5	17%
3	Insufficiently	9	30%	11	36%	1	3%	8	26%
4	Inactive	15	50%	7	24%	-	-	15	50%

Table 2: depicted that, In pre test, experimental group majority 15(50%) were found to be inactive, 9(30%) were insufficiently active, 6(20%) were sufficiently active. In the control group majority 11(36%) were insufficiently active, 10(33%) were sufficiently active, 2(7%) were active.

In the post test, experimental group majority 16(54%),were active, 13(43%) sufficiently active , 1(3%) were insufficiently active. In control group majority 15(50%) were inactive, 8(26%) were insufficiently active, 5(17%) were sufficiently active, 2(7%) were active**.(Fig.11)**

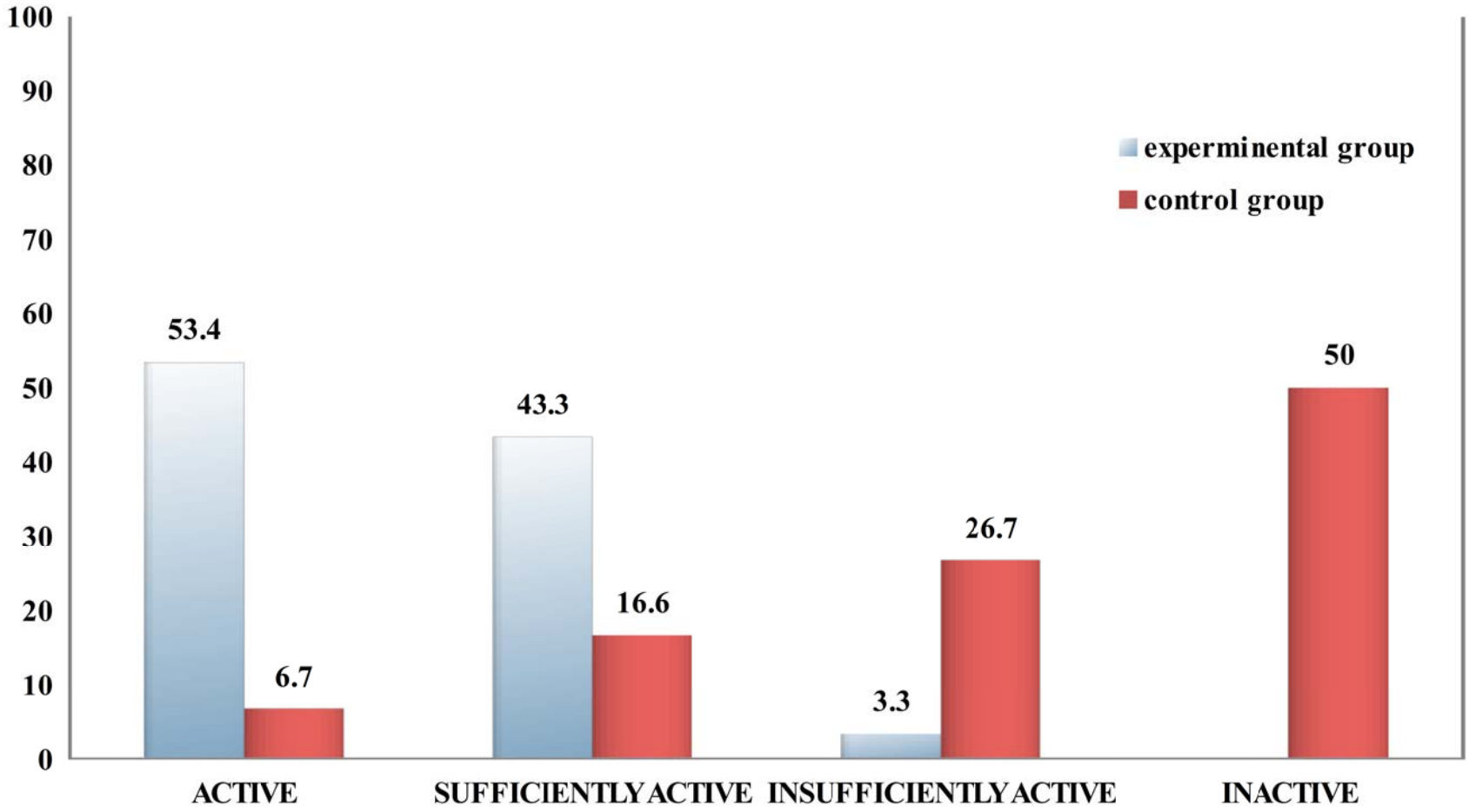


Figure 11: Percentage distribution of post test level of physical activity among patients with cancer

in experimental group and control group.

SECTION C: ASSESS THE PRE TEST AND POST TEST LEVEL OF FATIGUE AMONG PATIENTS WITH CANCER IN EXPERIMENTAL AND CONTROL GROUP.

TABLE 3 : Frequency and percentage distribution of pre test and post test level of fatigue among patients with cancer in experimental group and control group.

n_1 =30; n_2 =30

S. No	Level of fatigue	Pre test				Post test			
		Experimental group		Control group		Experimental group		Control group	
		f	%	f	%	f	%	f	%
1	No fatigue	-	-	-	-	-	-	-	-
2	Mild fatigue	-	-	4	14%	26	86%	4	14%
3	Moderate fatigue	-	-	1	3%	4	14%	6	20%
4	Severe fatigue	22	74%	11	36%	-	-	9	30%
5	Excessive fatigue	8	26%	14	47%	-	-	11	36%

Table 3: depicted that, in pre test, experimental group majority 22(74%) had severe fatigue and 8(26%) had excessive fatigue. In the control group majority 14(47%) had excessive fatigue, 11(36%) had severe fatigue, 4(14%) had mild fatigue and 1(3%) had moderate fatigue. In post test, in experimental group majority 26(86%) had mild fatigue, 4(14%) had moderate. In control group majority 11(36%) had excessive fatigue, 9(30%) had severe fatigue, 6(20%) had moderate fatigue and 4(14%) had mild fatigue. **(Fig.12)**

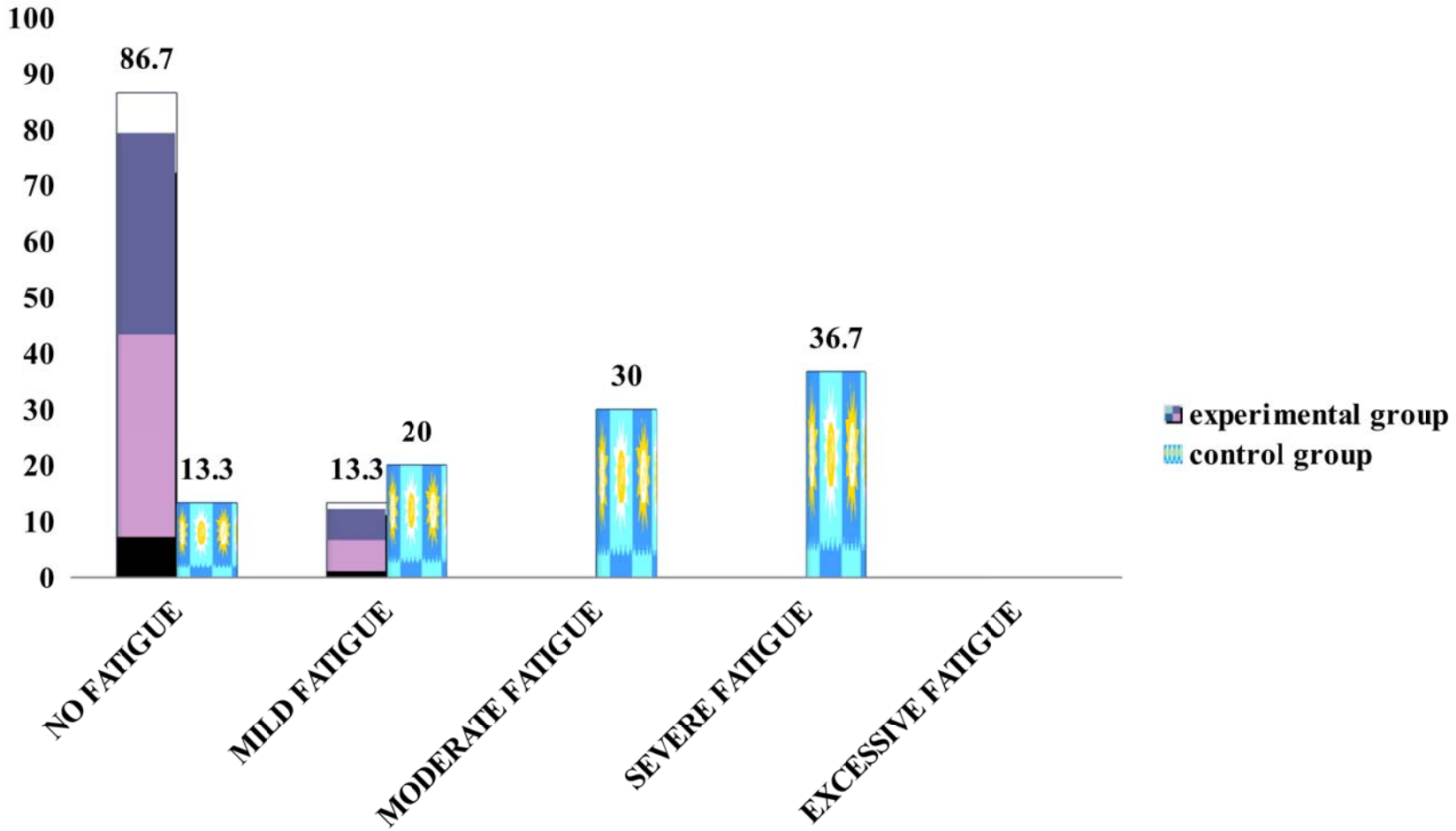


Figure 12: Percentage distribution of post test level of fatigue among patients with cancer

in experimental group and control group.

SECTION C : COMPARISON BETWEEN THE PRE TEST AND POST TEST LEVEL OF PHYSICAL ACTIVITY AMONG PATIENTS WITH CANCER IN EXPERIMENTAL GROUP.

Table 4 : Comparison of mean score, standard deviation, mean difference and paired 't' value of pre test and post test level of physical activity among patients with cancer in experimental group.

n =30

Sl. No	Variable	Mean	Standard deviation	Mean difference	Paired 't' value	Table value	Inference
1	Pre test	30.73	8.99	16.30	11.64	2.05	S
2	Post test	14.60	4.23				

df= 29 P<0.05

Table 4 showed that the mean pre test and post test scores of level of physical activity in experimental group was 30.73 (SD ±8.99) and 14.60 (SD ± 4.23) respectively. The mean difference was 16.30. The paired 't' value was 11.64 which was significant at P< 0.05 level, which showed that physical exercises were effective in improving the physical activity among patients with cancer. Therefore the hypothesis H_1 that the mean post test score of physical activity was significantly improved than the mean pretest score of physical activity in experimental group was accepted.

SECTION D : COMPARISON BETWEEN THE PRE TEST AND POST TEST LEVEL OF FATIGUE AMONG PATIENTS WITH CANCER IN EXPERIMENTAL GROUP.

Table 5 : Comparison of mean score, standard deviation, mean difference and paired‘t’ value of pre test and post test level of fatigue among patients with cancer in experimental group.

n= 30

Sl. No	Variable	Mean	Standard deviation	Mean difference	Paired ‘t’ value	Table value	Inference
1	Pre test	80.96	12.56	51.86	49.42	2.05	S
2	Post test	29.1	14.82				

df= 29 P<0.05

Table 5 showed that the mean pre test and post test scores of fatigue in experimental group was 80.96(SD ±12.56) and 29.1 (SD ± 14.82) respectively. The mean difference is 51.86. The paired ‘t’ value was 49.42 which was significant at P< 0.05 level , which showed that exercises were effective in reducing the fatigue. Therefore the hypothesis H_2 that the mean post test score of fatigue was significantly lower than the mean pretest score of fatigue in experimental group was accepted.

SECTION E: FIND THE EFFECTIVENESS OF EXERCISES ON PHYSICAL ACTIVITY AMONG PATIENTS WITH CANCER BETWEEN EXPERIMENTAL AND CONTROL GROUP.

TABLE 6: **Effectiveness of exercises on mean scores, standard deviation, mean difference and independent 't' value of post test level of physical activity among patients with cancer between experimental group and control group.**

n_1= 30; n_2=30

Sl. No	Group	Mean	Standard deviation	Mean difference	Independent 't' value	Table value	Inference
1	Experimental Group	14.60	4.23	15.5	8.07	2.00	S
2	Control Group	30.13	9.67				

df= 58 (P <0.05)

Table 6 showed that the mean post test score of physical activity in experimental group 14.60 (SD ± 4.23) was significantly improved than the mean post test score of physical activity in control group 30.13 (SD± 9.67). The mean difference was 15.5. The Independent 't' value was 8.07 which was significant at P < 0.05 level. The lowest mean score in the experimental group showed that exercises were effective in improving physical activity among patients with cancer.

Therefore the hypothesis H_3 that the mean post test score of physical activity in the experimental group was significantly improved than the mean post test score of physical activity in control group was accepted.

SECTION F: FIND THE EFFECTIVENESS OF EXERCISES ON FATIGUE AMONG PATIENTS WITH CANCER BETWEEN EXPERIMENTAL AND CONTROL GROUP.

Table 7 : Effectiveness of exercises on mean scores, standard deviation, mean difference and independent 't' value of post test level of fatigue among patients with cancer between experimental group and control group.

n_1= 30; n_2=30

Sl. No	Group	Mean	Standard deviation	Mean difference	Independent 't' value	Table value	Inference
1	Experimental Group	29.1	14.82	42.86	7.93	2.00	S
2	Control Group	71.96	23.97				

df= 58 (P <0.05)

Table 7 showed that the mean post test score of fatigue in experimental group 29.1(SD ± 14.82) was significantly lower than the mean post test score of fatigue in control group 71.96 (SD± 23.97). The mean difference was 42.86. The Independent 't' value was 7.93 which was significant at P < 0.05 level. The lowest mean score in the experimental group indicated that exercises were effective in reducing fatigue among patients with cancer.

Therefore the hypothesis H_4 that the mean post test score of fatigue in experimental group was significantly lower than the mean post test score of fatigue in control group was accepted.

SECTION G: ASSOCIATION BETWEEN THE POST TEST LEVEL OF PHYSICAL ACTIVITY AMONG PATIENTS WITH CANCER AND THEIR SELECTED DEMOGRAPHIC VARIABLES IN EXPERIMENTAL GROUP.

Table 8 : Association between the post test level of physical activity among patients with cancer and their selected demographic variables in experimental group.

n_1=30; n_2= 30

S. No	Demographic variables	Level of physical activity								x^2	Table value	Inference
		Active		Sufficiently Active		Insuffi-ciently Active		Inactive				
		f	%	f	%	f	%	f	%			
1	Age									10.92	12.59 df=6	NS
	a) 20- 25	-	-	-	-	-	-	-	-			
	b) 26- 30	1	3.3	1	3.3	-	-	-	-			
	c) 31-35	-	-	1	3.3	1	3.3	-	-			
	d) 36-40	1	3.3	1	3.3	-	-	-	-			
	e) 41-45	14	46.8	10	33.4	-	-	-	-			
2	Sex									0.43	5.9 df= 2	NS
	a) Male	5	16.7	4	13.3	-	-	-	-			
	b) Female	11	36.7	9	30	1	3.3	-	-			
3	Type of Family									4.2	5.9 df= 2	NS
	a) Nuclear	16	53.4	10	33.3	1	3.3	-	-			
	b) Joint	-	-	3	10	-	-	-	-			
4	Education									56.9	15.51 df= 8	S
	a) Illiterate	8	26.6	-	-	-	-	-	-			
	b) Primary	-	-	13	43.4	-	-	-	-			
	c) High school	6	20	-	-	-	-	-	-			
	d)Higher Secondary	2	6.7	-	-	-	-	-	-			
	e) Degree	-	-	-	-	1	3.3	-	-			

S.	Demographic	Level of physical activity		Ta	In

No	variables	Active		Sufficientl y Active		Insuffi -ciently Active		Inactive		x^2	ble value	ference
		f	%	f	%	f	%	f	%			
5	Occupation											
	a) Coolie	9	30	4	13.4	1	3.3	-	-			
	b) Private	2	6.7	2	6.7	-	-	-	-	1.73	15.51	NS
	c) Government	1	3.3	1	3.3	-	-	-	-		df= 8	
	d) Self Employed	1	3.3	-	-	-	-	-	-			
	e) Unemployed	3	10	6	20	-	-	-	-			
6	Religion											
	a) Hindu	16	50	11	40	1	3.3	-	-			
	b) Muslim	-	-	2	6.7	-	-	-	-	2.8	5.9 df= 2	NS
	c) Christian	-	-	-	-	-	-	-	-			
	d) Others	-	-	-	-	-	-	-	-			
7	Family monthly income											
	a) Rs.2000 – 4000	13	43.4	10	33.4	-	-	-	-		12.59	
	b) Rs.4001 – 6000	1	3.3	2	6.7	-	-	-	-	10.63	df= 6	NS
	c) Rs.6001 – 8000	1	3.3	1	3.3	1	3.3	-	-			
	d) Above Rs.8001	1	3.3	-	-	-	-	-	-			
8	Area of Residence											
	a) Urban	1	3.3	2	6.7	-	-	-	-	7.4	5.9 df= 2	S
	b) Rural	15	50	11	36.7	1	3.3	-	-			

S. No	Demographic variables	Level of physical activity				x^2	valueTable	Inference
		Active	Sufficientl y Active	Insuffi-ciently Active	Inactive			

		f	%	f	%	f	%	f	%			
9	Duration of Treatment a) 0 – 12 months b) 13 – 14months c) 15- 24 months d) 25 – 36 months e) 37 – 48months f) 49 – 60 months g) More than 60months	1 5 1 - - - - -	50 3.3 - - - - - -	11 2 - - - - - -	36.7 6.7 - - - - - -	1 - - - - - - -	3.3 - - - - - - -	- - - - - - - -	- - - - - - - -	0.67	5.99 df= 2	NS

NS=Not Significant

P<0.05

S=Significant

Table 8: Chi Square values were calculated to find out the association between post test level of physical activity among patients with cancer. The findings revealed that there was no significant association with demographic variables in experimental group at P<0.05 level of significance except education and area of residence.

Therefore the hypothesis H_5 that there will be a significant association between post test score of physical activity among patients with cancer and their selected demographic variables was rejected except for education and area of residence.

SECTION H: Find the association between post test level of fatigue among patients with cancer with their selected demographic variables.

Table: 9 : Association between the post test level of fatigue among patients with cancer and their selected demographic variables in experimental group.

n_1=30; n_2= 30

S. No	Demographic variables	Level of fatigue										x^2	Table value	Inference
		No fatigue		Mild fatigue		Moderate fatigue		Severe fatigue		Excessive fatigue				
		f	%	f	%	f	%	f	%	f	%			
1	Age													
	a) 20-25	-	-	-	-	-	-	-	-	-	-			
	b) 26-30	-	-	1	3.3	-	-	-	-	-	-	7.7	7.82 df=3	NS
	c) 31-35	-	-	1	3.3	2	6.7	-	-	-	-			
	d) 36-40	-	-	2	6.7	-	-	-	-	-	-			
	e) 41 – 45	-	-	22	73.4	2	6.7	-	-	-	-			
2	Sex													
	a) Male	-	-	6	20	3	10	-	-	-	-	4.3	3.84 df=1	S
	b) Female	-	-	20	66.7	1	3.3	-	-	-	-			
3	Type of Family													
	a) Nuclear	-	-	23	76.7	4	13.3	-	-	-	-	0.5	3.84 df=1	NS
	b) Joint	-	-	3	10	-	-	-	-	-	-			
4	Education													
	a) Illiterate	-	-	8	26.7	1	3.3	-	-	-	-			
	b) Primary	-	-	12	40	3	10	-	-	-	-			
	c) High school	-	-	3	10	-	-	-	-	-	-	8.31	9.49 df=4	NS
	d) Higher Secondary	-	-	2	6.7	-	-	-	-	-	-			
	e) Degree	-	-	1	3.3	-	-	-	-	-	-			

S.	Demographic	Level of fatigue					x^2		
		No	Mild	Moderate	Severe	Excessive			

No	variables	fatigue		fatigue		fatigue		fatigue		fatigue			Table value	Inference
		f	%	f	%	f	%	f	%	f	%			
5	Occupation													
	a) Coolie	-	-	12	40	2	6.7	-	-	-	-			
	b) Private	-	-	3	10	2	6.7	-	-	-	-			
	c) Government	-	-	4	13.3	-	-	-	-	-	-	5.2	9.49 df=4	NS
	d) Self Employed	-	-	4	13.3	-	-	-	-	-	-			
	e) Unemployed	-	-	3	10	-	-	-	-	-	-			
6	Religion													
	a) Hindu	-	-	24	80	4	13.3	-	-	-	-			
	b) Muslim	-	-	2	6.7	-	-	-	-	-	-	0.3	3.84 df=1	NS
	c) Christian	-	-	-	-	-	-	-	-	-	-			
	d) Others	-	-	-	-	-	-	-	-	-	-			
7	Family monthly income													
	a)Rs.2000–4000	-	-	19	63.3	4	13.3	-	-	-	-			
	b)Rs.4001–6000	-	-	2	6.7	-	-	-	-	-	-	1.3	7.82 df=3	NS
	c)Rs.6001–8000	-	-	3	10	-	-	-	-	-	-			
	d) < 8001	-	-	2	6.7	-	-	-	-	-	-			
8	Area of Residence													
	a) urban	-	-	22	73.4	4	13.3	-	-	-	-	0.69	3.84 df=1	NS
	b) rural	-	-	4	13.3	-	-	-	-	-	-			

S. N	Demographic variables	Level of fatigue					X^2		
		No	Mild	Moderate	Severe	Excessive			

o		fatigue		fatigue		fatigue		fatigue		fatigue			Table value	Inference
		f	%	f	%	f	%	f	%	f	%			
9	Duration of Treatment													
	a) 0 –12 months	-	-	23	76.7	4	13.3	-	-	-	-			
	b) 13–14months	-	-	3	10	-	-	-	-	-	-			
	c) 15- 24months	-	-	-	-	-	-	-	-	-	-	0.3	3.84 df=1	NS
	d) 25–36months	-	-	-	-	-	-	-	-	-	-			
	e) 37–48months	-	-	-	-	-	-	-	-	-	-			
	f) 49–60months	-	-	-	-	-	-	-	-	-	-			
	g) < 60months	-	-	-	-	-	-	-	-	-	-			

NS=Not Significant

P<0.05

S= Significant

Table 9 : Chi Square values were calculated to find out the association between post test level of fatigue among patients with cancer. The findings revealed that there was no significant association with demographic variables in experimental group at P<0.05 level of significance except for sex.

Therefore the hypothesis H_6 that there will be a significant association between post test score of fatigue among patients with cancer and their selected demographic variables was rejected except for sex.

CHAPTER - V

DISCUSSION

The discussion chapter deals with sample characteristics and objectives of the study. The aim of this present study was to assess the effectiveness of selected physical exercises on physical activity among patients with cancer in Erode cancer centre at Erode.

DISTRIBUTION OF SAMPLE CHARACTERISTICS:

Regarding age, in experimental group, 24(80%) belongs to the age group of 41-45 years, 3(10%) belongs to the age group of 31- 35 years, 2(6.7%) belongs to the age group of 36- 40 years, 1(3.3%) belongs to the age group of 26-30 years. In control group, 26(86.7%) belongs to the age group of 41-45 years, 2(6.7%) belongs to the age group of 36- 40 years, 1(3.3%) belongs to the age group of 26- 30 years, 1(3.3%) belongs to the age group of 31- 35 years.

With regard to sex, in experimental group, 21(70%) were females and 9(30%) were males. In control group, 20(66.7%) were females and 10(33.3%) were males.

Regarding the type of family in experimental group 27 (90%) were from nuclear family and 3(10%) were from joint family. In control group 28(93.3%) were from nuclear family and 2(6.7%) were from joint family.

With regard to education in experimental group, majority of the patients 13(43.3%) had primary education, 8(26.7%) were illiterates, 6 (20%) had high school education, 2(6.7%) had higher secondary education and 1(3.3%) were graduates. In control group, majority of the patients 12(40%) were illiterates, 12(40%) had primary education, 2(6.7%) had high school education, 4(13.3%) had higher secondary education.

Regarding occupation in experimental group, majority 14(46.7%) were coolie workers, 9(30%) were unemployed, 4(13.3%) were private employee

and 2(6.7%) was government employee, 1(3.3%) were self employed. In control group majority 20(66.7%) were coolie workers, 9(30%) were private employee, 1(3.3%) were government employee.

Regarding religion in experimental group, majority 28(93.3%) belonged to Hindu religion, 2(6.7%) belonged to Muslim religion. In control group majority 30(100%) belonged to Hindu religion.

With regard to family monthly income, in experimental group majority 23(76.7%) were in between Rs.2000-Rs.4000, 3 (10%) were in between Rs.4001-Rs.6000, 3 (10%) were in between Rs.6001-Rs.8000, and 1(3.3%) was above Rs. 8000. In control group majority 18(60%) were in between Rs.2000-Rs.4000, 9(30%) were in between Rs.4001-Rs.6000, 2 (6.7%) were between Rs.6001- 8000, 1(3.33%) was above Rs.8000.

With regard to area of residence, in experimental group, majority 26(86.7%) were in rural area and 4(13.3%) were in urban area. In control group majority 27(90%) were in rural area and 3(10%) were in urban area.

With regard to duration of treatment, in experimental group, majority 27(90%) were getting treatment for a period of 0- 12 months, 3(10%) were getting treatment for a period 13- 24 months. In control group 28(93.3%) were getting treatment for a period of 0- 12 months, 2(6.7%) were getting treatment for a period 13- 24 months**.**

THE FINDINGS OF THE STUDY ARE DISCUSSED ACCORDING TO THE OBJECTIVES AS FOLLOWS

1. To assess the pre test level and post test level of physical activity among patients with cancer in experimental and control group.
2. To assess the pre test and post test level of fatigue among patients with cancer in experimental and control group.
3. To compare the pre test and post test level of physical activity among patients with cancer in experimental group.
4. To compare the pre test and post test level of fatigue among patients with cancer in experimental group.
5. To find the effectiveness of exercises on physical activity among patients with cancer between experimental and control group.
6. To find the effectiveness of exercises on fatigue among patients with cancer between experimental and control group.
7. To find the association between post test level of physical activity among patients with cancer and their selected demographic variables in experimental group.
8. To find the association between post test level of fatigue among patients with cancer patients and their selected demographic variables in experimental group.

OBJECTIVE - I

To assess the pre test and post test level of physical activity among patients with cancer in experimental and control group.

Among patients with cancer in pre test, experimental group majority 15(50%) were found to be inactive, 9(30%) were insufficiently active, 6(20%) were sufficiently active. In the control group majority 11(36%) were insufficiently active, 10(33%) were sufficiently active, 10(33%) were sufficiently active, 2(7%) were active.

In the post test, experimental group majority 16(54%) were active, 13(43%) were sufficiently active, 1(3%) were insufficiently active. In control group majority 15(50%) were inactive, 8(26%) were insufficiently active, 5(17%) were sufficiently active, 2(7%) were active.

This study was consistent with the study findings of **Erik van Rossum .et.al., (2007)** The results revealed that GARS scores of ADL showed-1.20 as the estimate and -6.12 to 3.72 at CI of 95% in the ATP group and -2.00 as the estimate and -6.88 to 2.84 at the CI of 95% in control group. The between group difference estimate is 0.80 and -0.80 to 2.40 at CI of 95% which showed a significant decrease in physical activity.

OBJECTIVE – 2

To assess the pre test and post test level of fatigue among patients with cancer in experimental and control group.

Among patients with cancer in pre test, experimental group majority 22(74%) had severe fatigue and 8(26%) had excessive fatigue. In the control group majority 14(47%) had excessive fatigue, 11(36%) had severe fatigue, 4(14%) had mild fatigue and 1(3%) had moderate fatigue.

In post test, in experimental group majority 26(86%) had mild fatigue, 4(14%) had moderate fatigue. In control group majority 11(36%) had excessive fatigue, 9(30%) had severe fatigue, 6(20%) had moderate fatigue and 4(14%) had mild fatigue.

This study was consistent with the study findings of **Guru Karthikeyan .et.al., (2013) .**The findings revealed that out of 20 patients who received radiotherapy, 10% (2) reported mild fatigue, 45% (9) reported moderate, and 45% (9) reported severe fatigue. Among patients who received chemotherapy only 1 patient (1.69%) reported moderate fatigue, while rest all the patients reported severe fatigue 98.30%. Among patients who received concurrent chemo-radiation, 4 patients reported (9.52%) mild fatigue and 5 patients reported moderate fatigue (11.90%) and 33 patients experienced severe fatigue (78.57%).

OBJECTIVE – 3

To compare the pre test and post test level of physical activity among patients with cancer in experimental group.

The data analysis showed that in experimental group the mean pre test and post test scores of physical activity were 30.73 (SD ±8.99) and 14.60 (SD ± 4.23) respectively. The mean difference was 16.30. The paired 't' value was 11.64 which was significant at P< 0.05 level, which showed that exercises were effective in improving the physical activity among patients with cancer.

This study was consistent with the study findings of **Naraphong.W et.al.,(2014)** who reported that the level of physical activity is significantly higher in the experimental group than the control group (paired 't' test 2.28), at P=0.04 level of significance.

Therefore the research hypothesis H_1 that the mean post test score of physical activity is significantly improved than the mean pretest score of physical activity in experimental group was accepted.

OBJECTIVE – 4

To compare the pre test and post test level of fatigue among patients with cancer in experimental group.

The data analysis showed that the mean pre test and post test scores of fatigue in experimental group were 80.96(SD±12.56) and 29.1(SD±14.82) respectively. The mean difference was 51.86. The paired 't' value was 49.42 and the table value was 2.05 which was significant at P < 0.05 level.

This study was consistent with the study findings of **Macmillian EM.et.al., (2011)**who reported that exercise was able to significantly improve aerobic and musculoskeletal fitness and reduce cancer related fatigue compared with control groups at P < 0.01.

Therefore the hypothesis H_2 that the mean post test score of fatigue is significantly lower than the mean pretest score of fatigue in experimental group was accepted.

OBJECTIVE - 5

To find the effectiveness of exercises on physical activity among patients with cancer between experimental and control group.

The data analysis showed that the mean post test score of physical activity in experimental group 14.60 (SD ± 4.23) was significantly lower than the mean post test score of physical activity in control group 30.13 (SD± 9.67). The mean difference was 15.5. The Independent 't' value was 8.07 which was significant at $P < 0.05$ level.

This study was consistent with the study findings of **Saarto.T.et.al, (2014)** that physical exercises improved significantly the physical activity among patients of the intervention group compared with the controls at $P<0.001$.

This study concludes that exercises were effective in improving the physical activity.

Therefore the hypothesis H_3 that the mean post test score of physical activity in the experimental group is significantly improved than the mean post test score of physical activity in control group was accepted.

OBJECTIVE- 6

To find the effectiveness of exercises on fatigue among patients with cancer between experimental and control group.

The data analysis showed that the mean post test score of fatigue in experimental group 29.1(SD±14.82) was significantly lower than the mean post

test score of fatigue in control group 71.96(SD±23.97) where the mean difference was 42.86 and the independent‘t’ value was 7.93 which was significant at P<0.05.

This study was consistent with the study findings of **Banzer.W.et.al., (2014)** indicated that there was a significant decrease in fatigue among the experimental groups than control group which was significant at P<0.001.

Therefore the hypothesis H_4 that the mean post test score of fatigue in experimental group is significantly lower than the mean post test score of fatigue in control group was accepted.

OBJECTIVE – 7

To find the association between post test level of physical activity among patients with cancer and their selected demographic variables

Chi Square values were calculated to find out association between the mean post test levels of physical activity among patients with cancer and their selected demographic variables in experimental group. The findings revealed that there was no significant association between the mean post tests level of physical activity among patients with cancer and their selected demographic variables for experimental group except for education and area of residence.

This study was consistent with the study findings of **Miranda.R. Andrus et.al., (2002)** that those who read at or below the 4th grade level had a mean physical Sickness Impact Profile score of 6.54 compared with a mean score of 2.48 in those whose reading level was above the 4th grade level (P<0.0008). The illiteracy rate was also found to be associated with the area of residence especially among Caucasian Americans. This relationship remained significant after adjusting for potential confounding variables (P<0.002).

Therefore the hypothesis H_5 that there will be a significant association between post test score of physical activity among patients with cancer and their selected demographic variables was rejected except for education and area of residence.

OBJECTIVE - 8

To find the association between post test level of fatigue among cancer patients and their selected demographic variables.

Chi Square values were calculated to find out association between the mean post tests levels of fatigue among patients with cancer and their selected demographic variables in experimental group. The findings revealed that there was no significant association between the mean post tests levels of fatigue among patients with cancer and their selected demographic variables for experimental group.

Therefore the hypothesis H_6 that there will be a significant association between post test score of fatigue among patients with cancer and their selected demographic variables was rejected except for sex.

This study was in consistent with the study findings of **Erik van Rossum.et.al., (2014)** indicated that females were more fatigued than males. The between group difference estimate is 0.80 and -0.80 to 2.40 at CI of 95% which showed a significant decrease in physical activity caused by fatigue.

CHAPTER – VI
SUMMARY, CONCLUSION, IMPLICATIONS, RECOMMENDATION AND LIMITATIONS

This chapter is discussed under 5 headings

1. Summary
2. Conclusion
3. Implications
4. Recommendation
5. Limitation

SUMMARY OF THE STUDY

The aim of this present study was to assess the effectiveness of exercises on physical activity among patients with cancer in Erode cancer centre at Erode. The design used for the present study was Quasi experimental non equivalent pre test and post test control group only design. The conceptual frame work was based on modified "Wiedenbach's Helping Art of Clinical Nursing Theory (1964)". Sample size was 60 out of which 30 were in experimental group and 30 were in control group. Non probability purposive sampling method was used to select the samples of the study. The tool used for this study was Groningen's Activity Restriction Scale for assessing the level of physical activity and Fatigue Symptom Inventory scale for assessing the level of fatigue before and after intervention.

Data collection was done for a period of 6 weeks. From the first day samples were collected for experimental group. Per day 5-6 samples were collected till the samples were 30. On the 1st day, in experimental group data pertaining to the demographic variables was collected by structured interview schedule then the pre test was conducted to the participants by using Groningen's Activity Restriction Scale for assessing the level of physical activity, Fatigue Symptom Inventory scale was used to assess the fatigue. The

exercises were given to the participants which were carried out as a single session (30 minutes) per day for 15 days. After the intervention post test was conducted on the 15th day by using the same scale. After completing the experimental group, from 21st day onwards 5-6 samples were collected each day for control group. The same procedure was carried out until the samples were 30. On the first day demographic variables was collected by structured interview schedule, then pre test was conducted to the participants by using Groningen's Activity Restriction Scale for assessing physical activity, Fatigue Symptom Inventory scale for assessing fatigue. On the 15th day post test was conducted using the same scale in control group.

The data was analyzed using descriptive statistics and inferential statistics.

MAJOR FINDINGS OF THE STUDY

The major findings are,

- Regarding age, in experimental group, 24(80%) belong to the age group of 41-45 years, 3(10%) belong to the age group of 31- 35 years, 2(6.7%) belong to the age group of 36- 40 years, 1(3.3%) belong to the age group of 26-30 years. In control group, 26(86.7%) belong to the age group of 41-45 years, 2(6.7%) belong to the age group of 36- 40 years, 1(3.3%) belong to the age group of 26- 30 years, 1(3.3%) belong to the age group of 31-35 years.
- With regard to sex, in experimental group, 21(70%) were females and 9(30%) were males. In control group, 20(66.7%) were females and 10(33.3%) were males.
- Regarding the type of family in experimental group 27 (90%) were from nuclear family and 3(10%) were from joint family. In control group 28(93.3%) were from nuclear family and 2(6.67%) were from joint family.

- With regard to education in experimental group, majority of the patients 13(43.3%) had primary education , 8(26.7%) were illiterates, 6 (20%) had high school education, 2(6.7%) had higher secondary education and 1(3.3%) were graduates. In control group, majority of the patients 12(40%) were illiterates, 12(40%) had primary education, 2(6.7%) had high school education, 4(13.3%) had higher secondary education.
- Regarding occupation in experimental group, majority 14(46.7%) were coolie, 9(30%) were unemployed, 4(13.3%) were private employee and 2(6.7%) were government employee, 1(3.3%) were self employed. In control group majority 20(66.7%) were coolie, 9(30%) were private employee, 1(3.3%) were government employee.
- Regarding religion in experimental group, majority 28(93.3%) belonged to Hindu religion, 2(6.7%) belonged to Muslim religion. In control group majority 30(100%) belonged to Hindu religion.
- With regard to family monthly income, in experimental group majority 23(76.7%) were in between Rs.2000-Rs.4000, 3 (10%) were in between Rs.4001-Rs.6000, 3 (10%) were in between Rs.6001-Rs.8000, and 1(3.3%) was above Rs. 8000. In control group majority 18(60%) were in between Rs.2000-Rs.4000, 9(30%) were in between Rs.4001-Rs.6000, 2 (6.7%) were between Rs.6001- 8000, 1(3.33%) was above Rs.8000.
- With regard to area of residence, in experimental group, majority 26(86.7%) were in rural area and 4(13.3%) were in urban area. In control group majority 27(90%) were in rural area and 3(10%) were in urban area.

- With regard to duration of treatment, in experimental group, majority 27(90%) were taking treatment for a period of 0- 12 months, 3(10%) were taking treatment for a period 13- 24

months. In control group 28(93.3%) were taking treatment for a period of 0- 12 months, 2(6.7%) were taking treatment for a period 13- 24 months**.**

- The mean pre test scores of physical activity in experimental group was 30.73 (SD ±8.99) and the mean post test score was 14.60 (SD ± 4.23) respectively. The mean difference was 16.30. The paired 't' value was 11.64 which was significant at P< 0.05 level, which showed that exercises were effective in improving the physical activity among patients with cancer
- The mean pre test scores of fatigue in experimental group was 80.96(SD ±12.56) and the mean post test score was 29.1 (SD ± 14.82) respectively. The mean difference was 51.86. The paired 't' value was 49.42 which was significant at P< 0.05 level, which showed that exercises was effective in reducing the fatigue.
- The mean post test score of physical activity in experimental group 14.60 (SD ± 4.23) was significantly improved than the mean post test score of physical activity in control group 30.13 (SD± 9.67). The mean difference was 15.5. The Independent't' value was 8.07 which was significant at P < 0.05 level.
- The mean post test score of fatigue in experimental group 29.1(SD ± 14.82) was significantly lower than the mean post test score of fatigue in control group 71.96 (SD± 23.97). The mean difference was 42.86. The Independent 't' value was 7.93 which was significant at P < 0.05 level.

CONCLUSION

The present study was conducted to assess the effectiveness of exercises on physical activity and fatigue among patients with cancer in Erode Cancer Centre at Erode. The Independent 't' value for physical activity was 8.07 which

was significant at P < 0.05 level .The Independent 't' value for fatigue was 7.93 which was significant at P <0.05level. The results of the study concluded that exercises were effective in improving physical activity and reducing fatigue among patients with cancer.

IMPLICATIONS

The findings of the study have certain important implication for nursing service, nursing education, nursing administration, and nursing research.

Nursing Service

- ♣ The nurse must conduct inservice education about the non pharmacological measures used in treating patients with cancer.
- ♣ Nurse as the change agent, can introduce the various measures for the reduction of fatigue and improving physical activity among patients with cancer who were admitted in the ward.
- ♣ Nursing service department can arrange health education program in OPD for teaching the patient on physical activity.

Nursing Education

- ♣ The nurse educator can orient the students with alternative therapies in reducing the level of fatigue and improving the physical activity among patients with cancer.
- ♣ Nurse Educators should motivate the students to do mini projects on techniques to promote physical activity among patients with cancer.
- ♣ Nurse educators should conduct workshops/ seminars to update the knowledge of students to promote practicing alternative therapies among patients with cancer.
- ♣ The nurse educator can include exercises as a mean of non pharmacological therapy in the curriculum, which can be adopted by the students and the nursing personnel.

Nursing Administration

- ♣ Nurse administrator can organize continuing education program regarding promoting optimal wellbeing of patients living with cancer.
- ♣ Nurse administrator can organize conferences and can enhance the knowledge and practice of alternative therapies among patients with cancer in reducing fatigue and improving physical activity.
- ♣ Nurse administrator can prepare and distribute information booklet about physical activity to patients with cancer.
- ♣ Nurse administrator should conduct insservice education to disseminate the research findings through continuous nursing education to all nurses.
- ♣ Pamphlets, leaflets about physical exercise can be made available to nursing staff in the cancer ward and to nurse educators in nursing educational institution

Nursing Researcher

- ♣ The study findings can be a baseline for further studies to build upon for improving the body of knowledge in nursing
- ♣ The study findings can be effectively utilized by the emerging researchers to conduct further studies.

RECOMMENDATION

Based on the findings the following recommendations are stated

- Similar study can be replicated in a larger samples thereby findings can be generalized to a large population.

- Comparative study can also be done between the effectiveness of various non pharmacological measures on reducing discomfort such as fatigue and improving physical activity.
- Comparative study can also be done between the effectiveness of exercise and yoga on level of fatigue and physical activity among patients with cancer.

LIMITATIONS

- It was difficult for the samples to continue the course of exercise when they become ill because of treatment side effects.

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29. http://www.cancernet.nci.nih.gov

APPENDIX- A

PERMISSION LETTER

Ph: 0424 - 2339704,
2910700,
Cell : 98428 22443
Fax : 0424 - 2339705

ERODE CANCER CENTRE (P) LTD

1/393, Velavan Nagar (Near Chinthamani Petrol Bunk),
Perundurai Road, Thindal, **ERODE - 638 012. TAMIL NADU**
E-mail : erodecancercentre@gmail.com I web.www.erodecancercentre.org

Date : .....

Date:13.09.2014

This is to certify that **Ms. Edith.C II Year M.Sc.,** Nursing student of Bishop's College of Nursing, Dharapuram has completed her research project on "**A STUDY TO ASSESS THE EFFECTIVENESS OF EXERCIES ON PHYSICAL ACTIVITY AND FATIGUE AMONG PATIENTS WITH CANCER"** at Erode Cancer Centre at Erode for the period from 12.08.2014 to 20.09.2014.

During the above period her conduct and character were good.

Managing Director,

ERODE CANCER CENTRE
Velavan Nagar, Perundurai Road.
Thindal, ERODE - 638 012.

APPENDIX- B

LETTER SEEKING EXPERT'S OPINION FOR CONTENT VALIDITY

From

Ms.Edith.C,

Msc(Nursing) ll Year,

Bishop's college of Nursing,

Dharapuram.

To

Respected Madam/Sir,

Sub: Requisition for content validity of tool.

I am doing Msc(Nursing) ll year in Bishop's college of Nursing, Dharapuram under The Tamil Nadu Dr.M.G.R. Medical University, Guidy, Chennai. As a partial fulfillment of my M.Sc(Nursing) Degree Programme, I am conducting a research on, "**A study to assess the effectiveness of exercises on physical activity and fatigue among patients with cancer in selected hospitals."**A tool has been developed for research study. I am sending the above stated for your expert and valuable opinion. I will be thankful for your kind consideration. Kindly return it to the undersigned.

Thanking you,

Yours faithfully,

(Edith.C)

Enclosure:

1) Certificate of content validity.
2) Statement of the problem, objectives, operational definition, hypothesis.
3) Descripition of the tool and tool for data collection.
4) Self address envelope.

APPENDIX-C

MEDICAL SURGICAL NURSING

LIST OF EXPERTS OF VALIDATION

1. **Dr.K.Velavan,**

   M.D.R.T.,(consultant oncologist)
   Erode Cancer Centre,
   Thindal, Erode.

2. **Mrs.Ovai,**

   Asst. Professor,

   Medical surgical department,

   Shivparvathi Mandradiar Institute of health Sciences,

   Palayamkottai.

3. **Mrs.ManoRanjitham**,

   Principal,

   Medical Surgical Nursing Depatment,

   Sakthi college of Nursing,

   Achimangalam,

   Karur-3

4. **Mrs. Lavanya,**

   Vice Principal,

   Medical Surgical Depatment,

   Nandha College of Nursing,

   Erode-52

5. **Mrs. Reena,**

   Asst. Professor,

   Medical Surgical Nursing Department,

   Sakthi College of Nursing,

   Oddanchatram,

   Dindigul.

APPENDIX- D

CERTIFICATE FOR VALIDITY

This is to certify that the standardized tool on **"A STUDY TO ASSESS THE EFFECTIVENESS OF EXERCIES ON PHYSICAL ACTIVITY AND FATIGUE AMONG PATIENTS WITH CANCER IN SELECTED HOSPITAL AT ERODE"**, has been validated by me and found appropriate with mentioned suggestions.

SIGNATURE:

NAME:

Dr. K. VELAVAN, M.D.R.T.,
Reg. No. 52086
Consultant Oncologist
ERODE CANCER CENTRE
Velavan Nagar, Perundurai Road,
Thindal, ERODE - 638 012.

DESIGNATION:

COLLEGE:

CERTIFICATE FOR VALIDITY

This is to certify that the standardized tool on **"A STUDY TO ASSESS THE EFFECTIVENESS OF EXERCIES ON PHYSICAL ACTIVITY AND FATIGUE AMONG PATIENTS WITH CANCER IN SELECTED HOSPITAL AT ERODE"**, has been validated by me and found appropriate with mentioned suggestions.

SIGNATURE:

NAME: Ms. Ouval. J.

DESIGNATION: Asst. Professor.

COLLEGE: Sherparvathi Mandradiar Institute of Health Science – Palayakottai.

CERTIFICATE FOR VALIDITY

This is to certify that the standardized tool on **"A STUDY TO ASSESS THE EFFECTIVENESS OF EXERCIES ON PHYSICAL ACTIVITY AND FATIGUE AMONG PATIENTS WITH CANCER IN SELECTED HOSPITAL AT ERODE"**, has been validated by me and found appropriate with mentioned suggestions.

SIGNATURE: S. Saraswathi

Principal,
Sakthi College of Nursing,
Achimangalam, KARUR-5.

NAME: S. MANORANJITHAM

DESIGNATION: PRINCIPAL

COLLEGE: SAKTHI COLLEGE OF NURSING
KARUR-5

CERTIFICATE FOR VALIDITY

This is to certify that the standardized tool on **"A STUDY TO ASSESS THE EFFECTIVENESS OF EXERCIES ON PHYSICAL ACTIVITY AND FATIGUE AMONG PATIENTS WITH CANCER IN SELECTED HOSPITAL AT ERODE"**, has been validated by me and found appropriate with mentioned suggestions.

SIGNATURE: S. Lavanya

S. LAVANYA, M.Sc(N)., Ph.D.,
VICE PRINCIPAL
NANDHA COLLEGE OF NURSING
ERODE-52.

NAME: S. LAVANYA

DESIGNATION: VICE PRINCIPAL

COLLEGE: NANDHA COLLEGE OF NURSING
ERODE - 52

CERTIFICATE FOR VALIDITY

This is to certify that the standardized tool on **"A STUDY TO ASSESS THE EFFECTIVENESS OF EXERCIES ON PHYSICAL ACTIVITY AND FATIGUE AMONG PATIENTS WITH CANCER IN SELECTED HOSPITAL AT ERODE"**, has been validated by me and found appropriate with mentioned suggestions.

SIGNATURE:

NAME: Mrs. N. REENA

DESIGNATION: Asst. Professor.

COLLEGE: SAKTHI COLLEGE OF NURSING
ODDANCHATRAM
DINDIGUL (D.t)

APPENDIX-E

CERTIFICATE FOR ENGLISH EDITING

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the dissertation work **"A STUDY TO ASSESS THE EFFECTIVENESS OF EXERCIES ON PHYSICAL ACTIVITY AND FATIGUE AMONG PATIENTS WITH CANCER IN SELECTED HOSPITAL AT ERODE"**, done by **Edith.C, II M.Sc.,** Nursing student of Bishop's College of Nursing, Dharapuram is edited for English language appropriateness by

SIGNATURE: P. Sampath

NAME: P. SAMPATH

DATE:

ADDRESS: P. SAMPATH, M.A., M.Phil., B.Ed.
Lecturer in English,
Maharani Teacher Training Institute,
Dharapuram.

APPENDIX-F

CERTIFICATE FOR TAMIL EDITING

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the dissertation work **"A STUDY TO ASSESS THE EFFECTIVENESS OF EXERCIES ON PHYSICAL ACTIVITY AND FATIGUE AMONG PATIENTS WITH CANCER IN SELECTED HOSPITAL AT ERODE"**, done by **Edith.C, II M.Sc.,** Nursing student of Bishop's College of Nursing, Dharapuram is edited for Tamil language appropriateness by

SIGNATURE:

NAME:

DATE:

ADDRESS:

D.M.SENTHIL KUMAR, M.A.,B.Ed.,M.Phil
Guest Lecturer.
Department of Tamil,
Alagappa University Study Centre
DHARAPURAM - 638656

APPENDIX-G

TOOL- ENGLISH

PART- I

DEMOGRAPHIC VARIABLE

1. Age

a) 20-25 years
b) 26- 30 years
c) 31-35 years
d) 36-40 years
e) 41-45 years

2. Sex

a) Male
b) Female

3. Type of family

a) Nuclear family
b) Joint family

4. Education

a) Illiterate
b) Primary
c) High school
d) Higher secondary
e) Graduate

5. Occupation

a) Coolie
b) Private
c) Government
d) Self employed
e) Unemployed

6. Religion

a) Hindu
b) Muslim
c) Christian
d) Others

7. Family monthly Income

a) Rs.2000- 4000
b) Rs.4001- 6000
c) Rs.6001- 8000
d) Above Rs. 8001

8. Area of Residence

a) Urban
b) Rural

9. Duration of treatment

a) 0-12 months
b) 13-24 months
c) 25-36 months
d) 37-48 months
e) 49- 60 months
f) More than 60 months

PART- II

The Groningen Activity Restriction Scale (GARS)

S. NO	The Groningen Activity Restriction Scale	Yes I can do it fully 1independently without any difficulty	Yes I can do it fully 2independently but with some difficulty	Yes I can do it fully 3independently but with great difficulty	Yes needing complete 4help
1	Dress yourself?				
2	Get in and out of bed?				
3	Stand up from sitting in a chair?				
4	Wash your face and hands?				
5	Wash and dry your whole body?				
6	Get on and off the toilet?				
7	Feed yourself?				
8	Get around in the house (if necessary with a cane)?				
9	Go up and down the stairs?				
10	Walk outdoors (if necessary with a cane)?				
11	Take care of your feet and toenails?				

SCORING PROCEDURE

GRONINGEN ACTIVITY RESTRICTION SCALE	SCORES	PERCENTAGE
Active	0-11	0-25%
Sufficiently active	12-21	26-50%
Insufficiently active	22-32	51- 75%
Inactive	33-44	76- 100%

PART –III

Fatigue Symptom Inventory (FSI)

For each of the following, circle the one number that best indicates how that item applies to you.

1. Rate your level of fatigue on the day you felt **most** fatigued during the past week:

0 1 2 3 4 5 6 7 8 9 10

Not at all fatigued **As fatigued as I could be**

2. Rate your level of fatigue on the day you felt **least** fatigued during the past week:

0 1 2 3 4 5 6 7 8 9 10

Not at all fatigued **As fatigued as I could be**

3. Rate your level of fatigue on the **average** during the past week:

0 1 2 3 4 5 6 7 8 9 10

Not at all fatigued **As fatigued as I could be**

4. Rate your level of fatigue **right now**:

0 1 2 3 4 5 6 7 8 9 10

Not at all fatigued **As fatigued as I could be**

5. Rate how much, in the past week, fatigue interfered with your **general level of activity**:

0 1 2 3 4 5 6 7 8 9 10

No interference **Extreme interference**

6. Rate how much, in the past week, fatigue interfered with your **ability to bathe and dress yourself**:

0 1 2 3 4 5 6 7 8 9 10

No interference **Extreme interference**

7. Rate how much, in the past week, fatigue interfered with your **normal work activity (includes both work outside the home and housework)**:

0 1 2 3 4 5 6 7 8 9 10

No **Extreme**

interference

interference

8. Rate how much, in the past week, fatigue interfered with your **ability to concentrate**:

0 1 2 3 4 5 6 7 8 9 10

No **Extreme**

interference **interference**

9. Rate how much, in the past week, fatigue interfered with your **relations with other people**:

0 1 2 3 4 5 6 7 8 9 10

No
Extreme

interference **interference**

10. Rate how much, in the past week, fatigue interfered with your **enjoyment of life**:

0 1 2 3 4 5 6 7 8 9 10

No
Extreme

interference **interference**

11. Rate how much, in the past week, fatigue interfered with your **mood**:

0 1 2 3 4 5 6 7 8 9 10

No

Extreme

interference

interference

SCORING PROCEDURE

FATIGUE SYMPTOM INVENTORY	SCORES	PERCENTAGE
No fatigue	0	0%
Mild fatigue	1-36	0-25%
Moderate fatigue	37-65	26-50%
Severe fatigue	66-85	51-75%
Excessive fatigue	86-110	76-100%

PART-IV

TOOL- TAMIL

gFjp - m

Ra Fwpg;G

1. taJ

   m) 20 Kjy; 25 taJ tiu

   M) 26 Kjy; 30 taJ tiu

   ,) 31 Kjy; 35 taJ tiu

   <) 36 Kjy; 40 taJ tiu

   c) 41 Kjy; 45 taJ tiu

2. ghypdk;

   m) Mz;

   M) ngz;

3. FLk;g tif

   m) jdpf;FLk;gk;

   M) $l;Lf;FLk;gk;

4 . fy;tpj; jFjp

   m) gbg;gwptpd;ik

   M) Muk;g fy;tp

   ,) cah;epiy

   <) Nky;epiy

   c) gl;ljhhp

5. njhopy;

   m) $yp

   M) jdpahh;

   ,) murhq;fg; gzp

<) ifnjhopy;

c) Ntiyapd;ik

6. kjk;

m) ,e;J

M) K];yPk;

,) fpwp];Jth;

<) kw;wit

7. tUkhdk;

m) &.2000 Kjy; 4000 tiu

M) &. 4001 Kjy; 6000 tiu

,) &.6001 Kjy; 8000 tiu

<) &.8000 Nky;

8. ,Ug;gplk;

m) fpuhkGuk;

M) efh;Guk;

9. rpfpr;ir fhyk;

m) 0 Kjy; 12 khjq;fs; tiu

M) 13 Kjy; 24 khjq;fs; tiu

,) 25 Kjy; 36 khjq;fs; tiu

<) 37 Kjy; 48 khjq;fs; tiu

c) 49 Kjy; 60 khjq;fs; tiu

C) 60 khjq;fSf;F Nky;

gFjp - M

f;uhzpd;-[d; nray;ghl;il jLf;Fk; msTNfhy;

t. vz;	Nfs;tpfs;	, nra;avd;dhy; Rakhf vy;yhtw;iwAk; ; 1	vd;dhy; vijAk; ;Rakhf nra;a KbAk;. Mdhy; rpwpjsT 2	vd;dhy; vijAk; ;Rakhf nra;a KbAk;. Mdhy; mJ kpfTk; 3	vd;dhy; xd;Wk; ,ayhJ. Kw;wpYk; cjtp Njit 4
1	Milfis cLj;j Kbfpwjh?				
2	gLf;ifapy; gLf;fTk; gLf;ifapypUe;J vOk;gTk; Kbfpwjh?				
3	ehw;fhypapy; ,Ue;J vOk;g Kbfpwjh?				
4	cq;fs; Kfj;ijAk;> iffisAk; fOt Kbfpwjh?				
5	Fspf;f Kbfpwjh?				
6	foptiw nrd;W tu Kbfpwjh?				
7	czT cl;nfhs;s Kbfpwjh?				
8	tPl;bDs; cyhf Kbfpwjh?				
9	gb Vwp nry;y Kbfpwjh?				
10	ntspNa nry;y Kbfpwjh?				
11	cq;fs; if> fhy; efq;fis ghJfhf;f Kbfpwjh?				

gFjp - ,

Nrhh;tpd; mwpFwpfis fz;lwpAk; msTNfhs;

1. fle;j thuj;jpy; ePq;fs; kpfTk; Nrhh;thf fhzg;gl;l NghJ> me;j Nrhh;tpd; msT vd;d?

   0 1 2 3 4 5 6 7 8 9 10

   Nrhh;T kpFe;j

   ,y;iy Nrhh;T

2. fle;j thuj;jpy; ePq;fs; Fiwe;j msT Nrhh;thf fhzg;gl;l NghJ> me;j Nrhh;tpd; msT vd;d?

   0 1 2 3 4 5 6 7 8 9 10

   Nrhh;T kpFe;j

   ,y;iy
   Nrhh;T

3. fle;j thuj;jpy; ePq;fs; ruhrhpahf Nrhh;T fhzg;gl;l NghJ> me;j Nrhh;tpd; msT vd;d?

   0 1 2 3 4 5 6 7 8 9 10

   Nrhh;T kpFe;j

   ,y;iy Nrhh;T

4. ,g;NghJ cq;fSf;F ,Uf;Fk; Nrhh;tpd; msT vd;d?

   0 1 2 3 4 5 6 7 8 9 10

   Nrhh;T kpFe;j

   ,y;iy Nrhh;T

5. fle;j thuj;jpy; ePq;fs; Nrhh;thf ,Ue;j NghJ> me;j Nrhh;thdJ cq;fs; md;whl Ntiyfspy; ve;j mstpw;F jilahf ,Ue;jJ?

   0 1 2 3 4 5 6 7 8 9 10

   ve;j kpFe;j

   ghjpg;Gkpy;iy ghjpg;G

6. fle;j thuj;jpy; ePq;fs; Nrhh;thf ,Ue;j NghJ> me;j Nrhh;thdJ ePq;fs; Fspf;Fk; NghJk; Jzp khw;Wk; NghJk; ve;j mstpw;F jilahf ,Uf;fpwJ?

0 1 2 3 4 5 6 7 8 9 10

ve;j kpFe;j

ghjpg;Gkpy;iy ghjpg;G

7. fle;j thuj;jpy; ePq;fs; Nrhh;thf ,Ue;j NghJ me;j Nrhh;thdJ cq;fs; md;whl Ntiyfspy; mjhtJ tPl;bYk; rhp> ntspapYk; rhp ve;j mstpw;F jilahf ,Uf;fpwJ?

0 1 2 3 4 5 6 7 8 9 10

ve;j kpFe;j

ghjpg;Gkpy;iy ghjpg;G

8. fle;j thuj;jpy; cq;fs; ftdj;jpy; Nrhh;thdJ ve;j mstpw;F jilahf ,Uf;fpwJ?

0 1 2 3 4 5 6 7 8 9 10

ve;j kpFe;j

ghjpg;Gkpy;iy ghjpg;G

9. fle;j thuj;jpy; ePq;fs; kw;wth;fsplk; nfhz;Ls;s cwit Nrhh;thdJ ve;j mstpw;F jilahf ,Ue;jJ?

0 1 2 3 4 5 6 7 8 9 10

ve;j kpFe;j

ghjpg;Gkpy;iy ghjpg;G

10. fle;j thuj;jpy; ePq;fs; re;Njh\kha; ,Ue;j NghJ Nrhh;thdJ ve;j mstpw;F jilahf ,Ue;jJ?

0 1 2 3 4 5 6 7 8 9 10

ve;j kpFe;j

ghjpg;Gkpy;iy ghjpg;G

11. fle;j thuj;jpy; Nrhh;thdJ cq;fs; kdepiyia ve;j mstpw;F ghjpj;jJ?

0	1	2	3	4	5	6	7	8	9	10
ve;j ghjpg;Gkpy;iy									kpFe;j ghjpg;G	

APPENDIX H

PROCEDURE

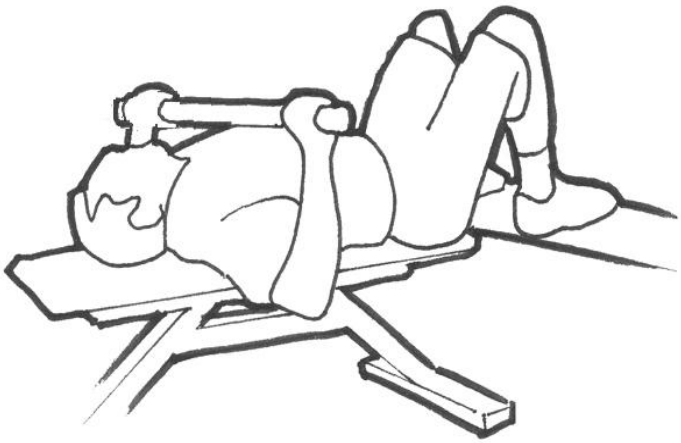
EXERCISES

1) Bench press

Region: Chest and arms

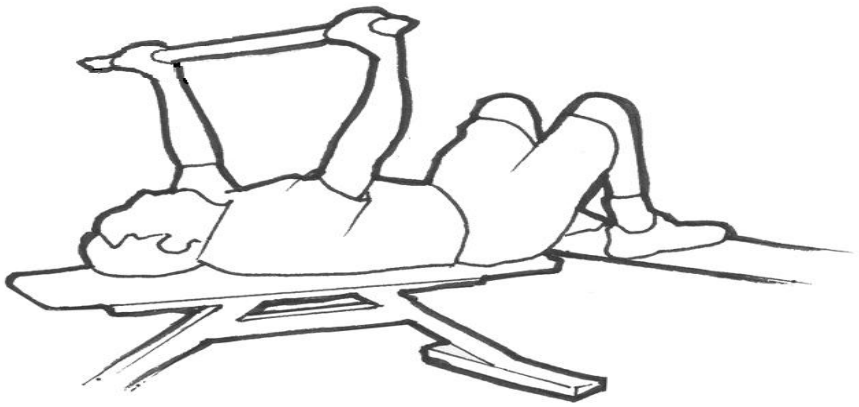
Major muscles: Pectoralis major, anterior deltoids, triceps brachii

Description: Extension of elbows and horizontal adduction of shoulder by pushing the resistance up and controlling the return



Starting position

Align elbows just below shoulder line and maintain approximately 90 degrees of elbow flexion at starting position.



Final position

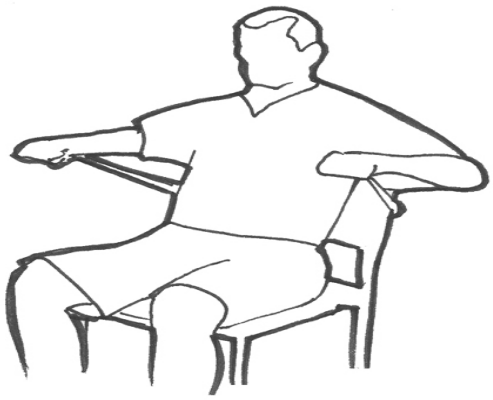
Fully extend elbow joint, breathing out during the lift. Maintain legs in a raised position to provide better support for the back (flat lower back position)

2) Seated chest press

Region: Chest and arms

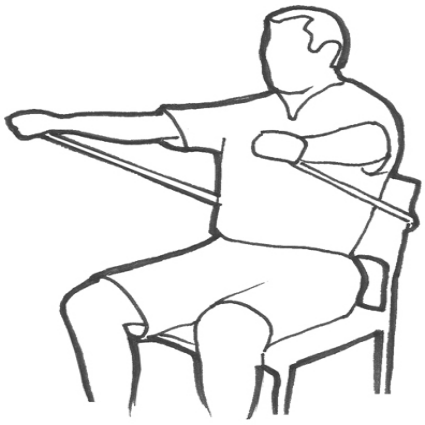
Major muscles: Pectoralis major, anterior deltoids, triceps brachii

Description: Extension of elbows and horizontal adduction of shoulder by pushing the resistance out and controlling the return



Starting position

Align elbows with shoulders and maintain approximately 90 degrees of elbow flexion at starting position.



Final position

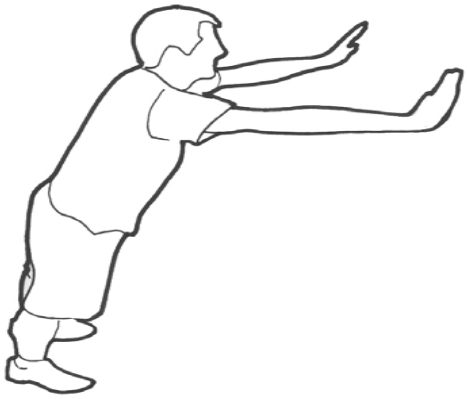
Fully extend the elbow joint, breathing out during the push (extension of arms). Maintain back flat against chair for proper support.

3) Standing push-up

Region: Chest, back and arms

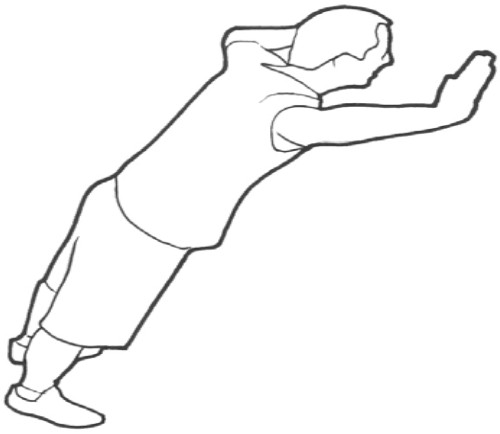
Major muscles: Pectoralis major, anterior deltoids, triceps brachii

Description: Extension of elbows and horizontal adduction of shoulder by pushing the body up and controlling the return



Starting position

Standing, feet shoulder-width apart, leaning slightly on the wall with outstretched arms.



Final position

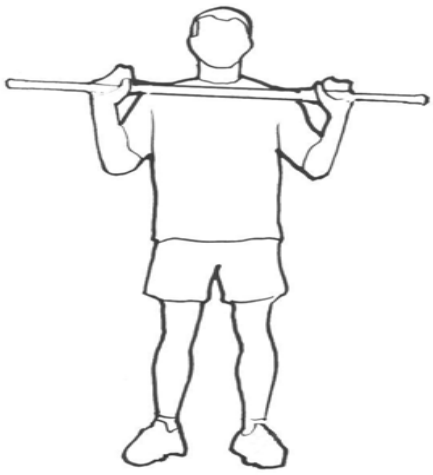
Move the body slowly towards the wall, bending the arms at the elbow, and then push out the body (bodyweight resistance). Breathe out when pushing the resistance up.

4) Standing shoulder press

Region: Shoulders and arms

Major muscles: Deltoids, triceps brachii, latissimus dorsi and biceps brachii

Description: Shoulder flexion/abduction and elbow extension



Starting position

Standing, feet shoulder-width apart. Holding the weight with elbows almost at full flexion (almost touching trunk).

Final position

Full extension of elbows and shoulder flexion. Breathe out during the lift and maintain good posture at all times.

5) Unilateral triceps extension

Region: Arms

Major muscles: Triceps brachii

Description: Extension of elbow with shoulder flexion.

Starting position

Standing, with shoulders flexed. Resistance on the exercising arm and other arm acting as support.

Final position

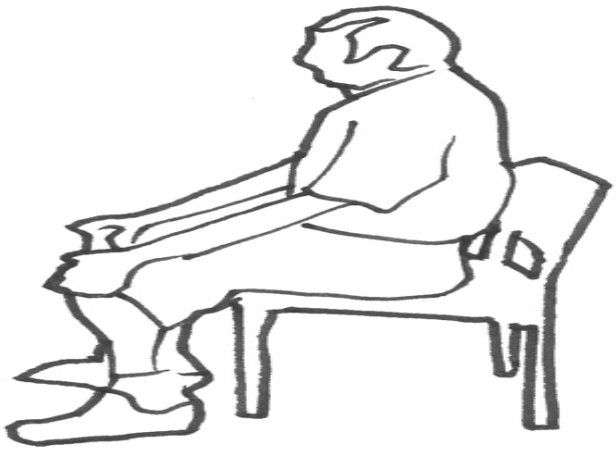
Fully extend the elbow, breathing out when lifting the resistance.

6) Chair rise

Region: Legs

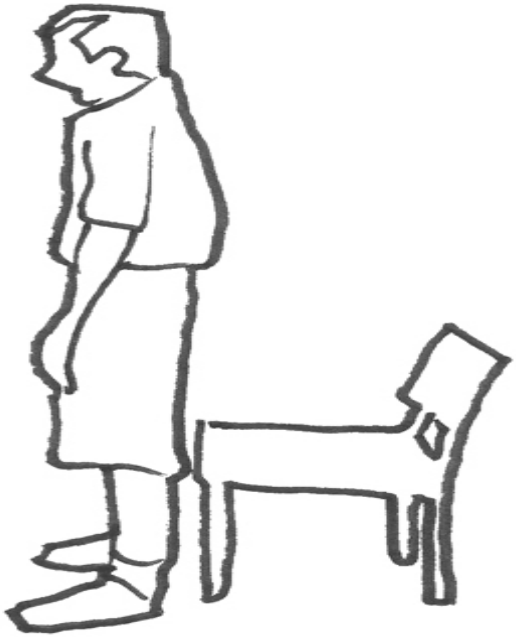
Major muscles: Quadriceps, hamstrings and gluteus

Description: Knee and hip extension.



Starting position

Seated, with hands on knees. Progress to arms across chest.



Final position

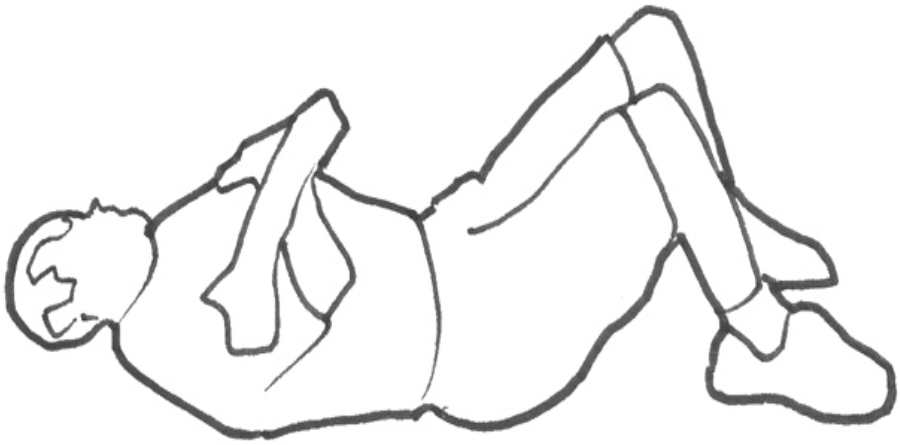
Stand, by extending hip and knees, with assistance of hands on knees. Progress to standing without assistance. Breathe out when standing.

7) Abdominal crunch

Region: Trunk

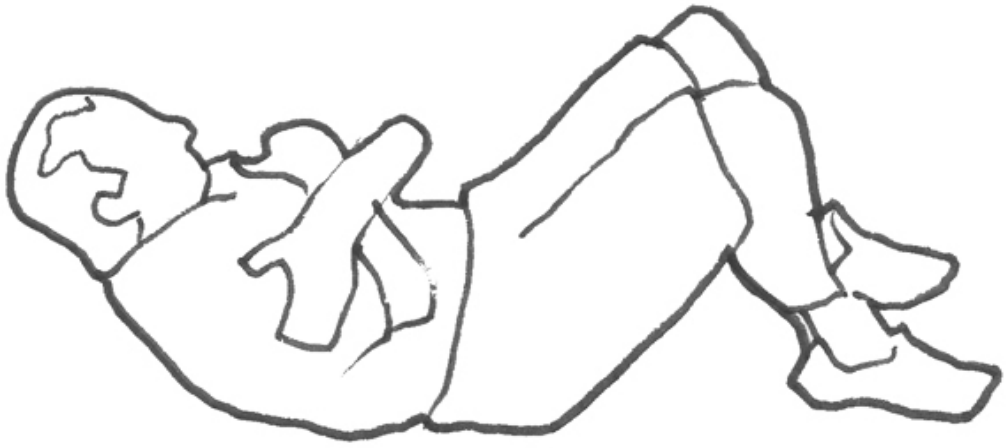
Major muscles: Rectus abdominis, internal and external oblique

Description: Partial flexion of trunk



Starting position

Hip and knee flexion with arms crossed together over the trunk. Lower back flat on the floor. For increased difficulty place hands on head.



Final position

Partially flex the trunk, maintaining the lower back flat on the floor during the lift. Breathe out on the way up and then return to starting position.

8) Shoulder stretch

Region: Arms

Major muscles: Deltoids

Description: Unilateral adduction of shoulders

Technique

Pull arm across chest, elbow just below shoulder line. Hold the position for several seconds (15-30 seconds). Perform the exercise for both sides.

9) Triceps stretch

Region: Arms

Major muscles: Triceps brachii

Description: Shoulder extension and elbow flexion

Technique

Raise arm, bend elbow and point forearm down the back. Pull arm, using elbow, down the back. Hold stretch for 15-30 seconds. Perform the exercise for both sides.

10) Lower back stretch

Region: Trunk

Major muscles: Lower back and hamstrings

Description: Seated trunk flexion

Technique

Sit with feet on the ground and knees partially bent the trunk forward and hold for 15-30 seconds.

APPENDIX-I

PHOTOS